Tradecision

Unique Software for Thinking Traders

User Manual

Version 3.0

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Contents

Contents **3**

Chapter 1 ..... **16**
Introduction **16**
What's New to Tradecision v3.0 17

Chapter 2 ..... **18**
Getting Started **18**
Functionality Overview 18
System Requirements 20
Recommended: 20
Minimum: 20
Compare Different Versions 21
Installing and Removing the Tradecision Software 23

Chapter 3 ..... **24**
Data Manager **24**
Opening and Closing Data Manager 26
Adding a New Symbol 27
Multiple Time Frame Addition for a Single Symbol Name 30
Adding a Group of Symbols 32
Updating Symbol Data 33
Importing Data from a Text File 34
Importing MetaStock Database 36
Updating Symbols Using the Batch Update Capability 37
Changing Data Source for All Symbols 39
Modifying Symbol Properties 41
Modifying Symbol Price Data 42
Deleting a Symbol 43
Deleting Price Data 44
Exporting Price Data 45
Using the Streaming Mode in Data Manager 46
Splits and Distributions 47
Understanding the Splits and Distributions concepts 47
Splits 47
Distributions 47
Adjusting Prices for Split or Distribution 48
Making Manual Adjustments 49
Applying Manual Adjustments 50
Viewing Data in the Symbol Data Pane 51
Viewing Event Log File 52
Changing Yahoo and Interactive Brokers Settings 53
Setting Connection Parameters for eSignal 54
MSN Money Data Support 56
Defining MSN Money as the Datasource for a New or Existing Symbol 56
Changing All Existing Symbols to MSN Money 56
Futures Symbols Manager 57
Understanding Futures Symbols Manager 57
Data Storing Capabilities 58
Using the Start Date option 58
Abridging Symbols in Data Manager 59
Limiting the Symbol Data Size 60
Restoring Streaming Mode from Previous Session 61
Exchange Management 62

Holiday Management 63
Holiday Management 63
Adding a Holiday List 63
Editing a Holiday List 65
To edit a holiday list: 65

Chapter 4 66
Charting 66
Charts overview 66
What are charts? 66
What is technical analysis? 66
Chart types 67
Line Chart 67
Bar Chart 68
Candlestick Chart or Japanese Candlesticks 69
Working with Charts 70
Opening a New Chart Using the Symbol Box 71
Creating a New Chart using the New Chart Command 72
Chart-Opening Option 74
Scrolling a Chart 76
Using Chart Time Frames 77
Customizing Charts 78
Changing the Background Color 79
Changing the Font 80
Changing the Chart Titles and Scrollbar Options 81
Enabling and Disabling the Chart Grid 82
Displaying Day Break Markers 83
Axes and Scaling 84
Choosing the Vertical Axis Scale Type 84
Using the Logarithmic Scale 86
Defining a Session Range 87
Zooming in on or out of Parts of a Chart 88
Changing Bar Spacing and Height 89
Increasing Bar Spacing 90
Decreasing the Bar Spacing 91
Increasing the Bar Height 91
Decreasing the bar height: 91
Custom Bars 92
Understanding Custom Bars 92

Chapter 5 94
Drawing Objects 94
Trendlines 95
Understanding trendlines 95
Up Trendline 95
Down Trendline 95
Using Trendlines 96
Drawing Trendlines 97
Extending a Trendline 98
Horizontal Line 99
Drawing a Horizontal Line 99
Extending a Horizontal Line 99
Vertical Line 100
Drawing a Vertical Line 100
Changing the Color and Style of a Vertical Line 101
Rectangle 102

Drawing a Rectangle 102
Ellipse 103
Understanding Ellipses 103
Drawing an Ellipse 103
Triangle 104
Understanding Triangle 104
Drawing a Triangle 104
Buy and Sell Markers 105
Text Label 107
Chart Markers 108
Inserting a Marker into a Chart 108

Fibonacci Numbers 109
Understanding Fibonacci Numbers 109
Managing Fibonacci Levels 110
Fibonacci Retracements 111
Drawing Fibonacci Retracements 112
Fibonacci Extension 114
Drawing a Fibonacci Extension 115
Fibonacci Circles 116
Drawing Fibonacci Circles 117
Fibonacci Fans 118
Understanding Fibonacci Fans 118
Drawing Fibonacci Fans 119
Fibonacci Time 120
Understanding Fibonacci Time 120
Drawing Fibonacci Time 120
Fibonacci Time Retracements 121
Drawing Fibonacci Time Retracements 122

Andrews' Pitchforks 123
Understanding Andrews' Pitchforks 123
Drawing Andrews' Pitchfork 124

Gann Analytical Tools 125
Understanding Gann techniques 125
Gann Angles 126
Gann Fan 127
Drawing a Gann Fan 128
Changing the Properties of a Gann Fan 129
Changing the Color and Style of Gann fan 130
Gann Cardinal Squares 131
Drawing Gann Cardinal Squares 132
Changing Gann Cardinal Squares properties 133
Changing the Color and Style of Gann Cardinal Squares 134
Gann Grid 135
Drawing Gann Grid 135
Changing the Properties of a Gann Grid 136
Changing the color and style of a Gann Grid 137
Moving Objects 138
Deleting Objects 138
Removing Groups of Objects from a Chart 138
Changing the Color and Style of an Object 138
Sub-charts 139
Volume Sub-Chart 140
Changing the Order of Sub-Charts 141

Deleting Sub-Chart 142
Exporting Chart Data 143

Chapter 6 144
Templates 144
Understanding Templates 144
Applying a Template 145
Saving as Template 145
Saving the Current Chart Settings as a Default Template 145

Chapter 7 146
Workspaces 146
Understanding Workspaces 146
Creating and Saving a Workspace 147
Opening Workspaces 148
Closing a Workspace 149
Deleting Workspace 150

Chapter 8 151
Technical Indicators 151
About Technical Indicators 151
Adding an Indicator 152
Customizing Indicator 153
Indicator Thresholds 154
Deleting Indicator 155
Indicator Descriptions 156
Acceleration Indicator 156
Accumulation/Distribution 156
Adaptive Moving Average 156
ADX – Directional Movement Indicator 156
ADX Classic (rounded) 156
ADXR (signal line) 156
Auto Trend Inter Indicator 157
Auto Trend Major Indicator 157
AutoTrend Minor Indicator 157
Average Price 157
Average True Range 157
Bollinger Band %B (Middle Line) 157
Bollinger Band High 158
Bollinger Band Low 158
Bollinger Band Width (High-Low) 158
CCI – Commodity Channel Index 158
Chaikin A/D Oscillator 159
Change 159
Correlation (directional) 159
Detrended Price Oscillator 159
Directional Movement Index 159
DMI Minus 159
DMI Plus 160
Ease of Movement 160
Ease Of Movement (smoothed) 160
Elliott Waves Inter Indicator 160
Elliott Waves Major Indicator 160
Elliott Waves Minor Indicator 160
Efficiency 160

EMA – Exponential Moving Average 160
Envelope High 161
Envelope Low 161
Forecasted Price 161
Linear Regression Line 162
N-ATR 162
MACD – Moving Average Convergence Divergence 162
Market Facilitation Index 162
Mass Index 162
Median Price 162
MFI – Money Flow Index 162
Momentum Indicator 163
Money Flow 163
OBV – On Balance Volume 163
Outside Bar 163
Parabolic SAR 163
Percent Change 163
Percent R 163
Price High 164
Price Low 164
Price Oscillator 164
Price Range 164
Price Range Midpoint 164
Price Volume Trend 164
Rate of Change 164
RSI – Relative Strength Index 164
R-squared 165
SMA - Simple Moving Average 165
Standard Deviation 165
Stochastic Relative Strength Index 165
Statistical Volatility 165
Stochastic %D 165
Stochastic %K 165
Stochastic Slow %D 166
Stochastic Slow %K 166
Swiss Army Knife Indicator 166
Time-series forecast 166
TMA - Triangular Moving Average 166
TRIX - Triple Exponential Average 166
TrueHigh 167
TrueLow 167
TrueRange 167
Typical price 167
Ulcer Index 167
Ultimate Oscillator 167
Velocity (slope) 167
Volatility Indicator 167
Volatility Standard Deviation 168
Volume Average 168
Volume Oscillator 168
Volume Rate of Change 168
Weighted Close Indicator 168
Weighted Moving Average 168
Williams' Accumulation/Distribution 169

WTop Inter Indicator 169
WTop Major Indicator 169
WTop Minor Indicator 169

Chapter 9 170
Analytical Studies 170
Auto-Trends 171
Understanding the Auto-trends study 171
Auto-trend types 171
Running the Auto-trends Study 172
Tuning the Auto-trends Algorithm 174
Bars Back 174
Pivots 175
Understanding the Pivots Study 175
Running the Pivots Study 176
Single-Bar Patterns 177
Understanding the Single-Bar Patterns Study 177
Gap 177
Thrust Days 177
Run days 177
Wide-Ranging days 177
Running the Single-Bar Patterns Study 179
Reversal Patterns 180
Understanding the Reversal Patterns Study 180
Head and Shoulders 181
Running the Reversal Patterns Study 182
Elliott Waves 183
Understanding the Elliott Waves Theory 183
A Brief Overview of the Elliott Waves Theory 184
Types of Impulse Waves 185
Other Elliott Concepts 185
Running the Elliott Waves Study 186
Custom Elliott Waves 187
Fibonacci Clusters 188
Understanding the Fibonacci Clusters Study 188
Running the Fibonacci Clusters 189
Noise Removal 191
Using the Noise Removal Functionality 192
Cancelling Noise Removal 193

Chapter 10 194
Improvian Language 194
Introduction 194
What is Improvian? 194
What can you create? 194
Understanding the Language 196
Basic Elements of the Language 197
Combinations, allowed in an expression 197
Syntax Characteristic in Builders 197
Trading Technique 197
Characteristic 197
User Function 197
Strategies 197
Indicators 197
Studies 197
Models 197

InputExp 197
Operator Semantics 198
Operator Precedence 199
Function 200
Variables 201
Arrays 202
Inputs 203
Reserved Words 204
Value 205

Using Improvian Editor 206
Creating Trading Techniques using Built-in Functions 209
Viewing the Details of a Function 210
Using AutoComplete 210
Using Variables 210
Using Upper and Lower cases 210
Using Comments 210
Using Spacing 210
Using Clipboard Commands 210
Customizing the View 211
Printing 212
Font, Background and Foreground 212
Referencing Price Data of Other Symbols 213

Technique Interdependencies 214
Reviewing Technique Interdependencies 214
Improvian: Glossary of Terms 215

Trace Watcher 217
Understanding Trace Watcher 217
Using Trace Watcher 218

Improvian Options 219
General Tab 219
Calculations 219
Traces 219
Skip Words Tab 220
Adding a Skip Word 220
Removing a Skip Word 220
Printing Tab 222
Editor Tab 223
Code Templates Tab 224
Predefined Variables Tab 225
Adding a Predefined Variable 225
Editing a Predefined Variable 227
Deeleting a Predefind Variable 228

Chapter 11 229
Indicator Builder 229
Understanding Custom Indicators 230
Creating a Custom Indicator 231
Modifying a Custom Indicator 232
Copying a Custom Indicator 233
Deleting a Custom Indicator 234
Import/Export 235
Importing Indicators 235

Exporting Indicators 236

Chapter 12 237
Study Builder 237
Understanding Study Builder 238
Creating a Custom Study 239
Customizing a Custom Study 240
Editing a Custom Study 241
Copying a Custom Study 242
Deleting a Custom Study 243
Inserting a Custom Study into a Chart 244
Import/Export 246
Importing Custom Studies 246
Exporting Custom Studies 247

Chapter 13 248
Neural Model Builder 248
Understanding Neural Models 249
Introduction to Genetic Algorithms 250

Introduction to Neural Networks 251
TGeneral Information 251
What Are Neural Networks? 252
Biological Prototype 253
Preparing Data for Neural Networks 254
Using a Neural Network 255

Creating a New Model 256
New Model Wizard 257
Step 1: Select the Model Target and Lookahead 258
Selecting Target 260
Step 2: Select Training and Test Data Ranges 261
Selecting Model Test Period 264
Step 3: Select Model Inputs 265
Writing Model Inputs 268
Optimizing Model Inputs 269
Selecting the Right Amount of Input Data 271
Selecting Input Columns 271
Step 4: Defining Model-Based Strategy for Performance Report 272
Optimizing Variables 276
Specifying the Range of the Selected Optimization Variable 276
Specifying the Optimization Algorithm and its Properties 278
Using the Advanced Optimization Criterion 280
Selecting Additional Stopping Conditions for Genetic Algorithms 281
Understanding the Feature 281
Training a Model 283
Editing a Model 284
Deleting a Model 285
Analyzing Model Performance 286
Viewing Summary Information 287
Input Importance Chart 290
Actual versus Forecasted Graph 290
Understanding Model-Based Strategies 291
Preventing Curve-Fitting 292
Inserting Model Signals into a Chart 293
Price Forecasting 294

Inserting the Model Output into a Strategy 295
Saving a Model Output as.csv file 296
Import/Export 297
Importing a Neural Model 297
Exporting a Neural Model 298

Chapter 14 299
Strategy Builder 299
Understanding Trading Strategies 299
Using Strategy Builder 300
Creating a New Strategy 301
Creating a New Neural Strategy 303
Understanding Order Types of Trading Strategies 306
Selecting an Order for a Strategy 307
Inserting a Strategy into a Chart 309
Editing a Strategy 311
Copying a Strategy 312
Deleting a Strategy 313
Importing and Exporting a Strategy 314
Importing Strategies 314
Exporting Strategies 314

Strategy optimization (Professional Editions) 315
Understanding Strategy Optimization 315
Understanding Optimization Algorithms 316
Walk-Forward Testing (Strategy Builder) 317
Understanding Walk-Forward Testing 317

Strategy Optimization Wizard 319
Starting the Strategy Optimization wizard 319
Step 1: Selecting Symbol 320
Step 2: Parameters to be Optimized 321
Step 3: Optimization Algorithm 322
Genetic Algorithm Parameters 324
Selecting Additional Stopping Conditions for Genetic Algorithms 325
Step 4: Optimization Data Ranges 327
Step 5: Optimization Results 329

Direct Trade Execution (DTE) 331
How DTE Works 331
DTE Mode for Several Symbols and Several Strategies 331
Activating the DTE Mode 332
Trading Toolbar 334
Trading History 334
DTE Mode Settings 336
Interactive Brokers Settings 337

Money Management 338
Understanding Money Management 338
Money Management Editor 339
General 340
Commission 341
Slippage 342
Position Size 343
Using Custom Formula for Position Size 345
Stop Loss 346

Trailing Stop 347
Profit Target 348

Chapter 15 349
Simulation Manager 349
Understanding Simulations 349
Working with Simulation Manager 350
Creating a New simulation (the New Simulation wizard) 351
Step 1: General Information 352
Step 2: Symbols 353
Step 3: Strategies 354
Analyzing a Simulation 355
Summary Report 356
Profit Distribution 357
MAE/MFE 358
Analyzing MFE and MAE 359
Analyzing Net Profit by Period 360
Inserting Simulation Signals into a Chart 362
Grouping and Filtering Simulations 363
Viewing simulation Information 364
Running Simulation 365
Deleting a Simulation 365
Saving Simulation Reports in the CSV (Excel) format. 366
Saving Strategy Signals in the CSV (Excel) Format 367
The Equity Curve Indicator 368
Understanding Equity Curve 368
Plotting Equity Curve on a Chart 368

Analyzing Strategy Performance 369
Strategy Performance Report 369
Summary 370
Trades 372
Return 373
Risk 374
Drawdown and Run-up 375
Outlier Trades 376
Time Analysis 377
Trades Report 378
Equity and Drawdown Curves 380

Chapter 16 381
Function Builder 381
Understanding Functions 381
Creating a New Function 382
Editing a Function 383
Copying a Function 384
Deleting a Function 385
Importing a Function 385
Exporting a Function 386
Importing a Function from TradeStation 387
Importing a Function from TradeStation 387

Chapter 17 389
Alert Builder 389
Understanding Alerts 389
Creating an Alert 390

Deleting an Alert ... 393
Copying an Alert ... 394
Import/Export ... 395
Importing Alerts ... 395
Exporting Alerts ... 396

Chapter 18 ... 397
NeatScan Market Scanner ... 397
Understanding Tradecision NeatScan ... 397
Using Built-In Library of Scans ... 399
Defining Custom Columns ... 399
Choosing a Time Frame ... 399
Filtering by Price and Volume ... 399
Opening the Scanner ... 400
Running a Scan ... 401
Creating a New Scan ... 402
Editing a Scan ... 403
Deleting a Scan ... 403
Creating a New Scan Group ... 403
Deleting a Scan Group ... 403
Import/Export ... 404
Importing Scans ... 404
Exporting Scans ... 404
Using the Filtering Functionality for Scanning ... 405
Using Additional Options for Scanning ... 406
Displaying Scanning Results in Charts ... 407
Selecting Columns ... 408
Exporting scanning Results into a Text File ... 409

Chapter 19 ... 410
DLL Manager ... 410
Understanding DLL Manager ... 410
Registering a New Function ... 411
Editing a Function ... 413
Removing a Function ... 414

Chapter 20 ... 415
Custom Time Series ... 415
Adding New Custom Time Series ... 416
Reloading All the Existing Time Series ... 418
Defining Advanced Text Import Parameters ... 419
Modifying the Custom Time Series ... 421
Deleting Custom Time Series ... 422

Chapter 21 ... 423
Preferences Functionality ... 423
General tab ... 423
Objects tab ... 425
Alerts tab ... 426
Strategy Alerts Customization ... 427
Outputting Alerts into a Text File ... 429
Real Time tab (for Real Time edition only) ... 431
Trading Tab ... 432
Interactive Brokers tab ... 433

Chapter 22 434
Real Time Edition 434
Locating Opportunities in Real-Time 434
Upgrades 434
Receiving Real Time Data 434
Key Features 434
Data Manipulations 436
Strategy Execution 437
Real Time Advanced Charting 437
Setting Up the IQfeed Real-Time Mode 438
Configuring Data Manager 439
Configuring Interactive Brokers 440
Configuring Interactive Brokers in Data Manager 440
Futures Symbols 441
Streaming Mode 442
Exchange Management 444
Selecting Interactive Brokers Preferences 446
Switching on the Streaming Mode 447
Selecting Time Frames 448
Selecting Day Session Range 449
Allowing Trades Across Day Breaks 450

Chapter 23 451
FAQ - Frequently Asked Questions 451
Q. How can I try the software before I buy it? 452
Q. What is a "30-Day Money Back Guarantee"? 452
Q. How can I determine that the software is right for me? 452
Q. What are the strengths of your software? 452
Q. Which would be better for me to purchase - Standard or Professional Edition? 453
Q. Can you guarantee I will become rich after buying your software? 454
Q. Is it really so easy to make a profit? 454
Q. What makes Tradecision different from other trading software in the market? 454
Q. Is Tradecision easy to use? 454
Q. Can I install Tradecision on multiple computers? 455
Q. Has Tradecision any help materials? 455
Q. What about support? How long does your technical support last and how much does it cost? 455
Q. Will I pay for the products just once or monthly/annually? 455
Q. Which markets can I trade using Tradecision? 455
Q. Why are you selling the software instead of making $$$ using it? 456
Q. I would like to get more info about Alyuda. 456
Q. I am a beginner trader. Couldn't you please recommend a resource for traders where I can find some valuable information? 456
Q. Can I work with Candlestick Chart? 458
Q. Can I work with Point & Figure Chart? 458
Q. Can I work with weekly/monthly charts? 458
Q. Can I display the charts of two or more different stocks at the same time? 458
Q. What should I mark with buy/sell markers? 458
Q. What are Fibonacci Retracements? 459
Q. How many sub-charts can I open? 459
Q. Can I save my charts with modifications the way I like? 459
Q. Could you tell me what the Elliott Waves Theory is about? 461
Q. How does Tradecision Elliott Waves? 461
Q. Where I can read about the description of indicators? 461
Q. What is Fibonacci Clusters? 461
Q. Can I build my own indicator? 462

Q. Can I use data and indicators from 2 stocks in one neural study? I think qqv will be helpful while predicting qqq. 462
Q. Is it really so easy to build a profitable strategy based on neural forecasting? 463
Q. Why can neural networks be better than other technical analysis techniques? 463
Q. What are neural networks? 464
Q. Do I need the knowledge in neural networks / programming / statistics / artificial intelligence to effectively use your software? 464
Q. What level of accuracy should I expect while making predictions about out-of-sample stock data? 464
Q. What information should I feed into a neural model to achieve good forecasting results? 464
Q. What types of neural networks are used in Tradecision? 465
Q. What is the target column? 465
Q. What is a trading system and what is it for? 466
Q. Can I use back-testing in Tradecision? 466
Q. What is the Strategy Performance Report? 467
Q. What is strategy simulation? 467
Q. What is a strategy optimization? 468
Q. How can I manage my trading strategies? 468
Q. What is the Improvian Language? 468
Q. Its pretty hard to learn using the Improvian Language, isn't it? 468
Q. Why using money management rules is important for me? 469
Q. What kind of money management rules can I use with Tradecision? 469
Q. What are the Optimal F, Kelly, Fixed Fractional Trades and Williams formulas? 469
Q. What is a Trailing Stop? 470
Q. What kinds of data feeds does Tradecision support? 471
Q. How can I import MetaStock data? 471
Q. I have problems with importing data from ASCII files. What am I doing wrong? 471
Q. How to import data from ASCII files? 471
Q. What are the key capabilities provided by Tradecision Real Time? 473
Q. How can I select the streaming mode? 473
Q. Where my real-time data will be saved? 473
Q. What real-time data feeds will be supported in the future versions? 473
Q. Can I import intra-day data from a text files? 473

Keyboard Shortcuts 474
Disclaimer 480
Support 481

Chapter 1

Introduction

Tradecision is a professional-level trading software application for charting, technical analysis and building trading systems.

As well as employing the best of the commonly used techniques, Tradecision uses neural networks and genetic algorithms, providing several exclusive technical analysis capabilities.

Uisng proven techniques and Alyuda's proprietary built-in algorithms, Tradecision users can analyze markets, test their ideas and maximize their profits while keeping their risks low and rewards high.

Whether you are purely a chartist, non-linear analysis adept, money management expert, or Elliott follower; whether you trade stocks, futures, currencies, or indices, Tradecision is capable of giving you the tools that will enable you to perfom outstanding-quality market analysis.

Tradecision offers traders carefully selected, cream-of-the-crop analytical techniques, responsive support service and a seasoned development team that is always ready to assist them in their pursuits.

The Tradecision application provides functionality for performing the following trading tasks:

- Charting with easy-to-use drawing tools;
- Analyzing price data using indicators and analytical studies;
- Developing and testing trading systems that are based on neural networks and technical indicators;
- Strategy back-testing with Simulation Manager;
- Using genetic algorithms for fast and efficient trading system optimization.
- Forecasting market moves and turning points.

What's New to Tradecision v3.0

In the new version, the functionality of the system has been greatly expanded to include several easy-to-use valuable capabilities that allow the application to interface directly with brokers, receive price data in the streaming mode, and execute trades automatically.

The Direct Trade Execution functionality includes a capability that allows the user to easily and quickly view a history of all past transactions for a specified period of time. In addition, the user can easily select a successful simulation or simulations, created and tested in the application's Simulation Manager, and launch their automatic execution by means of the Direct Trade Execution functionality.

Chapter 2

Getting Started

Functionality Overview

The Tradecision application provides the following functionality:

Trading Systems

- Strategy Builder;
- Direct Trade Execution (DTE);
- Simulation Manager;
- Improvian Language;
- Function Builder;
- DLL Manager;
- Portfolio testing;
- Comprehensive reports and graphs.

Money Management

- Point-and-click money management editor;
- Stop-loss, trailing stop and profit target rules;
- Optimal F, Kelly, Fixed Fractional Trades and Williams formulas;
- Custom Formula for Position Size.

Artificial Intelligence

- Wizard-based creation of neural models;
- Neural network-based predictions and strategies;
- Fast optimization with Genetic Algorithms.

Charting

- Charts in the line, bar or candlestick styles;
- Trend-lines, Fibonacci, Gann, Pitchforks, figures and other drawing tools;
- Up to 6 visible sub-charts;
- Templates.

Analytical Studies and Indicators

- More than 10 analytical studies, including Noise Removal, Ingenious Moving Average, trends analysis, patterns, Fibonacci clusters;
- Hurst Exponent;
- The most popular indicators including RSI, %R, MACD, OBV, Stochastics and more;
- Custom Indicators and Custom Studies;
- Jurik Research's tools;
- Custom Time Series.

Elliott Wave Analysis

- Automatic wave identification;
- Automatic corrections identification;
- Custom wave definition for experts.

Data Management

- Data Manager with free end-of-day data downloader (Yahoo & MSN);
- Streaming data: eSignal, IQfeed, Interactive Brokers;
- User-configurable ASCII import wizard;
- Built-in Metastock® and CSI database importer.

Intraday Trading

- All techniques in real-time;
- Custom minute charts;
- eSignal, IQfeed, Interactive Brokers data support;
- Import MetaStock® and ASCII intraday databases.

NeatScan Market Scanner

- In-built library of scans;
- Custom scan criteria;
- Advanced filtering.

System Requirements

Before installing Tradecision, make sure that the following system requirements are met:

Recommended:

Processor: 3.0 GHz Pentium 4 or compatible. But the faster the better;.

RAM: As much as possible. We recommend that you upgrade your computer or laptop to the maximum memory supported by your machine, starting from 512 MB RAM;

Hard Drive: Tradecision uses approximately 40MB of hard drive space. However, it is better to have more space to store your studies, models and trading systems;

Monitor: 17" monitor with 1280x1024 resolution;

Operating System: Windows 2000 or Windows XP (Home or Professional);

Internet Connection: Direct (ISDN, Cable Modem, DSL) connection to the Internet;

Power Supply: Uninterruptible Power Supply (UPS), for securing your equipment against any possible power outages. Your computer, monitor and modem must all be connected to UPS.

For intensive backtesting studies, optimizations, neural models with multiple inputs and drawn objects on chart, we recommend 2.6GHz Pentium 4 processor and 1GB of RAM.

Minimum:

Processor: 800 MHz Pentium III or compatible
RAM: 256 MB
Hard Drive: 40 MB free space
Monitor: 800x600 monitor resolution or higher
Operating System: Windows 2000 or XP
Software: Microsoft Internet Explorer 5.0

Attention eSignal Users!

In case of using eSignal please make sure you have eSignal v. 7.9 or higher installed on your PC.

In order to start using eSignal data in the Tradecision Data Manager, you need to run and then shut down eSignal several times to get the new .tab files from the eSignal data feed. It usually takes 2 (occasionally 3-5) restarts of eSignal. Normally, the process does not take more than a few minutes.

Compare Different Versions

There are three different versions of the Tradecision application currently available: Standard, Professional, and Professional Real Time.

The following table summarizes the differences between the different versions.

Feature	**Standard**	**Professional**	**Professional Real-Time**
Data Manager	**X**	**X**	**X**
Charting & Drawing tools	**X**	**X**	**X**
Technical Indicators	**X**	**X**	**X**
Analytical Studies	**X**	**X**	**X**
Custom Time Series	**X**	**X**	**X**
Elliott Wave Analysis	**X**	**X**	**X**
Neural Networks	**X**	**X**	**X**
Improvian Language	**X**	**X**	**X**
Strategy Builder & System Backtesting	**X**	**X**	**X**
Function Builder		**X**	**X**
DLL Manager		**X**	**X**
Advanced Money Management	**X**	**X**	**X**
Free daily data from MSN and Yahoo	**X**	**X**	**X**
Reads MetaStock, CSI, and ASCII files	**X**	**X**	**X**
Custom Indicators & Custom Studies		**X**	**X**
Alert Builder		**X**	**X**
Neural models and strategy optimization with Genetic Algorithms		**X**	**X**
Streams IQfeed, eSignal, IB real time data			**X**
Price	**$ 698**	**$ 1198**	**$ 1598**

Tradecision Standard Edition is designed for active traders who require all kinds of tools for reliable trading decision support. However, to the system does not support building custom indicators, alerts, functions and using complex trading strategies that require optimization.

Tradecision Professional Edition is designed for professional traders who use their own indicators and used to build multi-input/multi-parameter trading systems, requiring fast and efficient optimization with genetic algorithms.

Tradecision Professional Real Time Edition is aimed to give intraday traders the real-time analytics needed to make profitable trading decisions.

Installing and Removing the Tradecision Software

To install Tradecision:

1. Run the **exe** file that contains the Tradecision installation;

2. Follow the instructions provided by the installion screens to complete the installation.

3. Copy the **license.dat** file to C\Programs File\Alyuda Tradecision.

For the Tradecision application to work properly, the **Tradecision** program folder (typically, **C:\Program Files\Alyuda Tradecision**) must contain the **license.dat** file. This file was sent to you soon after you had purchased the software.

The installation wizard will create Tradecision folder with program files, help and examples, and register DLLs.

To remove Tradecision:

1. Open the Windows Control Panel.

2. Double-click **Add/Remove Programs**.

3. From the list of the installed programs, select **Tradecision** and click the **Add/Remove** button.

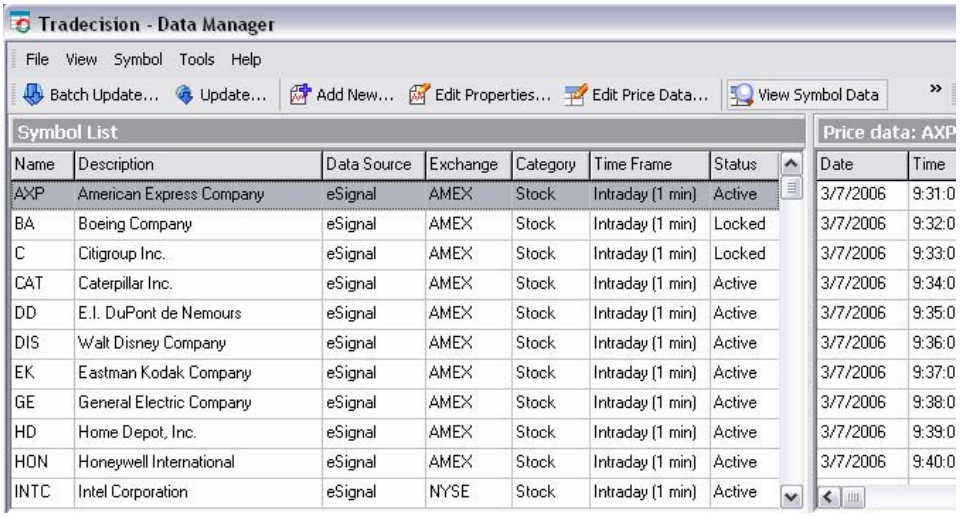
4. Follow the instructions contained in the InstallShield Wizard.

Chapter 3

Data Manager

Data Manager is a tool, designed to help you collect and maintain market data.

Before using Tradecision for technical analysis and strategy testing, you must collect price data to be used using Data Manager. Price data allows you to build charts and view price quotes. Price data includes Open, High, Low, Close, Volume, and Open Interest information for a specific time period.


Tradecision - Data Manager
File View Symbol Tools Help
Batch Update... Update... Add New... Edit Properties... Edit Price Data... View Symbol Data
Symbol List
Price data: AXP
Name | Description | Data Source | Exchange | Category | Time Frame | Status
AXP | American Express Company | eSignal | AMEX | Stock | Intraday (1 min) | Active
BA | Boeing Company | eSignal | AMEX | Stock | Intraday (1 min) | Locked
C | Citigroup Inc. | eSignal | AMEX | Stock | Intraday (1 min) | Locked
CAT | Caterpillar Inc. | eSignal | AMEX | Stock | Intraday (1 min) | Active
DD | E.I. DuPont de Nemours | eSignal | AMEX | Stock | Intraday (1 min) | Active
DIS | Walt Disney Company | eSignal | AMEX | Stock | Intraday (1 min) | Active
EK | Eastman Kodak Company | eSignal | AMEX | Stock | Intraday (1 min) | Active
GE | General Electric Company | eSignal | AMEX | Stock | Intraday (1 min) | Active
HD | Home Depot, Inc. | eSignal | AMEX | Stock | Intraday (1 min) | Active
HON | Honeywell International | eSignal | AMEX | Stock | Intraday (1 min) | Active
INTC | Intel Corporation | eSignal | NYSE | Stock | Intraday (1 min) | Active
Date | Time
3/7/2006 | 9:31:0
3/7/2006 | 9:32:0
3/7/2006 | 9:33:0
3/7/2006 | 9:34:0
3/7/2006 | 9:35:0
3/7/2006 | 9:36:0
3/7/2006 | 9:37:0
3/7/2006 | 9:38:0
3/7/2006 | 9:39:0
3/7/2006 | 9:40:0

To start working with Data Manager, you need to add the symbols for which you want to collect data. Data Manager will not download and manage data for those symbols that are not included in its **Symbol List**.

The following Data Manager subsystems allow you to input price data into the internal database:

- Built-in downloader provides a quick way of getting free end-of-day quotes from major US and international exchanges via **Yahoo Finance** and **MSN** data provider.
- Streaming data from **eSignal, IB** and **IQFeed** data (for Tradecision Pro Real Time edition only).
- User-configurable **ASCII** import wizard allows you to read quotes stored on your local hard drive in the format you can define.
- Built-in **MetaStock** database importer reads all stocks directly from your MetaStock databases, including intraday data.
- **CSI** database support.

Once the data is loaded or downloaded, it can be used with Tradecision for technical analysis, development of strategies and their testing.

Opening and Closing Data Manager

To open Data Manager:

1. From the **Tools** menu of Tradecison, select **Data Manager**.
The *Data Manager* window will be displayed.

To close Data Manager:

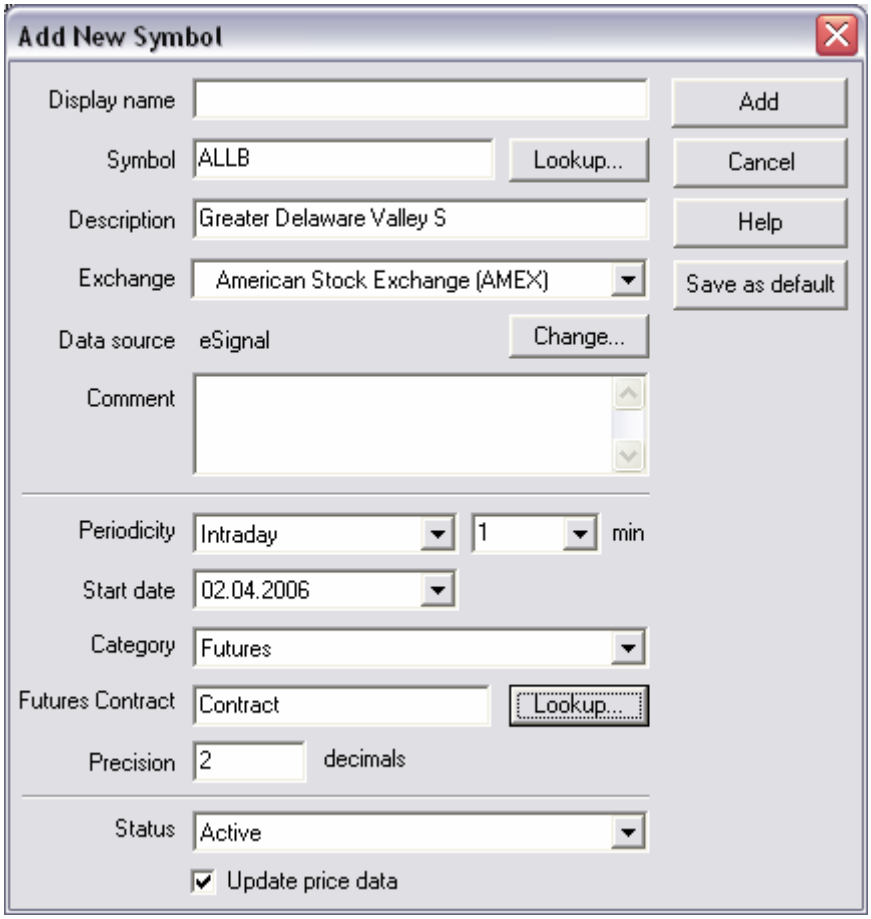
1. From the Data Manager **File** menu, select **Exit**.
The application will be closed.

Adding a New Symbol

To add a new symbol to the Symbol List:

1. From the **Symbol** menu, select **Add New.**

The *Add New Symbol* dialog box is displayed.



2. In the **Display name** box of the *Add New Symbol* dialog box, enter the name of the symbol that you want to add.

Note: *Data Manager allows creating several aliases for a symbol. This can be useful if you want to make, for example, a YHOO symbol with end-of-day data and YHOO with real-time minute data. So you can type different display names for a single symbol.*

3. In the **Symbol** text box, enter the symbol that you want to add.

NOTE: *If you need to select something else, the* ***Symbol Lookup*** *dialog box will help you choose your way to find and add a symbol. You can select a symbol by Exchange, Category, or Ticker List. Alternatively, you can type the first letter of the symbol you need from the drop-down list box.*

4. Click **OK**.

5. In the **Data Source** sub-group, click the **Change** button to select a data source from which you need to download data.

The *Data Source* dialog box is displayed.

6. In the *Data Source* dialog box, select **CSI**, **IQfeed**, **IB**, **eSignal**, **TC2005**, **MetaStock**, **Text File, MSN Money** or **Yahoo Finance** and define the appropriate parameters and click **OK**.

7. Enter the following information in the corresponding boxes:

- **Description** – enter a description of the symbol.
- **Comment** – enter a comment, if required.

8. From the **Category** list, select the appropriate symbol category.

9. If you need to select a futures contract, do the following:

- Click **Lookup** next to the **Futures Contract** box;

The *Futures Symbols Manager* window will display information on the available future contracts.

- Select the required futures contract and click **OK** ,

–OR–

If you do not need to select a futures contract, skip to Step 10 of this procedure.

***Note**: The point value and margin for the selected futures contract are taken by the system automatically from Futures Symbols Manager.*

10. From the **Periodicity** list, select **Daily**, **Weekly**, **Monthly**, **Intraday** or **Multiple** (RT edition only) time frame.

11. In the **Start date** box, select the symbol's staring date.

12. In the **Precision** text box, enter the required decimal value.

***Note:** With the **Precision** option, you can specify what level of digital precision the price data for the selected symbol should have. For example, if you set 4, the price will be 23.3045, and if you set 2 (default value), it will be 23.30. If you select FOREX as the symbol category, the precision will automatically be set to 4. The precision level affects both Data Manager (price data grids) and Tradecision (chart Y axis).*

13. From the **Status** list, select *Active* or *Inactive.*

***Note:** The Inactive status allows you to skip price data downloading for a symbol when you click the **Batch Update** button.*

14. If you want to download the symbol data immediately, select the **Update price data** check box.

15. Click **Add**.

The new symbol will be added to the **Symbol List**. Now you can download or import price data for this symbol and use this data in Tradecision.

Note: *If you want the newly created set of parameters to be applied to all symbols created by you, click* ***Set as Default****.*

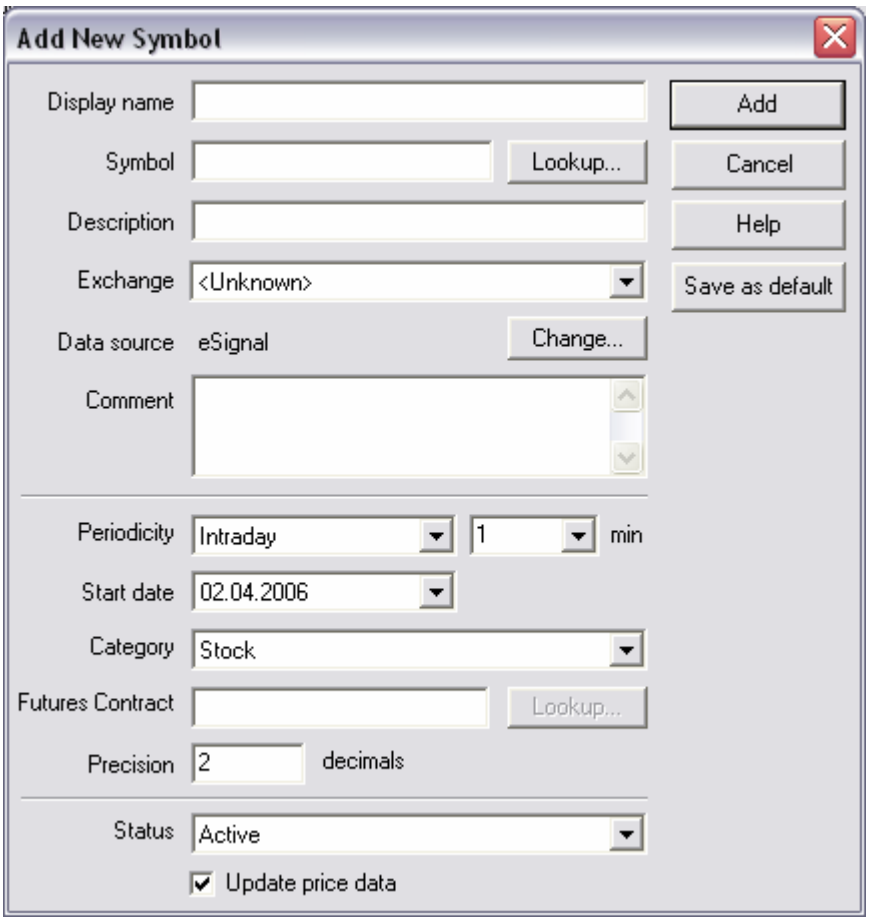
Multiple Time Frame Addition for a Single Symbol Name

This capability enables you to create several instances of a single symbol, but with different time frames. For example, you can easily create AXP with a minute, daily and weekly periodicity with just a few clicks.

To create several symbol instances for a single symbol name:

1. In Data Manager, click **Add New**.

The *Add New Symbol* dialog box will be displayed.



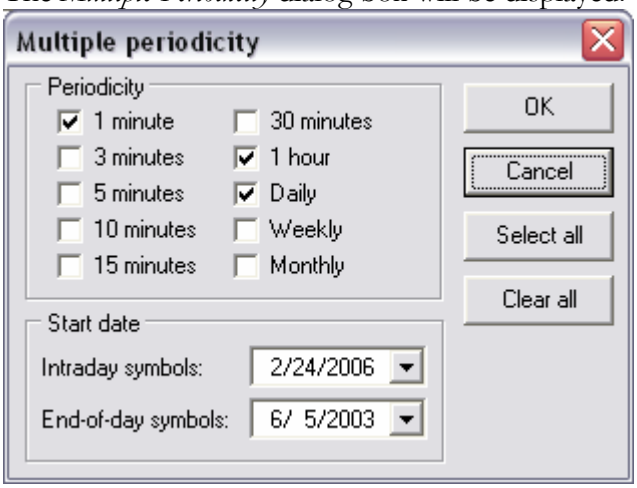
2. In the **Display name** box of the *Add New Symbol* dialog box, enter the name of the symbol that you want to add, for example, Exxon Mobil.

3. In the **Symbol** box, enter the genuine name of the symbol as listed at the corresponding exchange, for example, XOM.

4. In the **Data Source** area, click the **Change** button to select the data source from which the data for the symbol will be downloaded.

5. From the **Periodicity** list, select **Multiple**.

The *Multiple Periodicity* dialog box will be displayed.



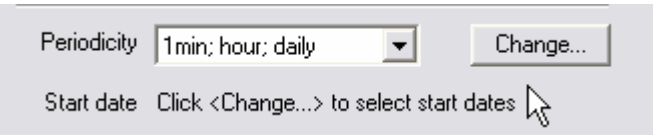
6. From the **Periodicity** area, select the time frame(s) you need to create the new symbol instances. For example, if you would like to create the XOM symbols with 1 min, hourly and daily periodicity, you need to select the corresponding check boxes.

***Note**: you can use the **Select all** or **Clear all** options to speed up the selection procedure.*

7. In the **Start Date** area, select the starting points for Intraday and end-of-day symbols.

8. Click **OK**.

You will see the new symbol periodicity parameters of the in the *Add New Symbol* dialog box.



9. Click **OK**.

The new symbols will appear on the Symbol List:

EXXON MOBIL, 1MIN
EXXON MOBIL, DAILY
EXXON MOBIL, HOUR

Adding a Group of Symbols

The system enables adding a group of symbols.. It allows you to select symbols from the in-built ticker lists.

To add a group of symbols in Data Manager:

1. From the **Symbol** menu, select **Add from a Ticker List**.

The *Add from a Ticker List* dialog box is displayed.

2. From the **Ticker List** in the *Add From a Ticker List* ialog box, select the ticker list you need.

The **Symbols** group box will display the symbols that the selected ticker list contains.

***Note**: You can clear a check box next to a symbol you do not need to use. To facilitate the selection process, the **Select All** and **Clear All** buttons can be used, if appropriate.*

3. Select the **Update added symbols** check box to start updating data for the selected symbols.

4. Click **OK**.

The selected symbols will be added to the **Symbol List** of Data Manager.

***Note:** Data Manager downloads data with parameters you set as default. That is why in Data Manager go to **Add New** or **Edit Properties**, select configurations you need (Data Source, Periodicity, etc) and click **Set as Default** button. So, any new data that you want to add or update with the help of **Add from a Ticker List** command will be proceeding ONLY with these settings. For example, when you add S&P 500 from Data Manager by selecting **Symbol > Add from a Ticker List >** select **S&P 500,** ALL these symbols will be added with the parameters you indicated when click **Set as Default** button in the **Add New** or **Edit Properties.** However, settings for different symbols can be defined without clicking the **Set as Default** button.*

Updating Symbol Data

To update data for a symbol on the Symbol List:

1. From the **Symbol List,** select the symbol the data for which you want to update.

2. From the **File** menu, select **Update**.

3. Select the **Receive new data** or **Refresh all stored data** check box.

4. Click **OK**.

Note: *Yahoo Finance uses suffixes for non-US stocks. Thus, in order to get quotes for non-US symbol you would need to add the corresponding suffix to the ticker symbol. The suffixes in alphabetical order are:.AS - Amsterdam,.AX - Australia (ASX),.BC - Barcelona,.BE - Berlin,.BO - Bombay,.BM - Breman,.BR - Brussels,.BA - Buenos Aires,.CL - Calcuta,.CR - Caracas,.V - CDNX,.CO - Copenhagen,.D - Dusseldorf,.F - Frankfurt,.H - Hamburg,.HA - Hanover,.HK - Hong Kong,.I - Ireland,.JK - Jakarta,.KA - Karachi,.KQ - Kosdaq,.KS - KSE,.KL - Kuala Lumpur,.L - London,.LM - Lima,.LS - Lisbon,.MA - Madrid,.MX - Mexico,.MI - Milan,.MU - Munich,.NS - NSE,.NZ - New Zeland,.OL - Oslo,.PA - Paris,.SN - Santiago,.SS - Shanghai,.SZ Shenzhen,.ST - Stockholm,.SG - Stutgart,.TW - Taiwan,.TA - Tel Aviv,.TO - Toronto,.VA - Valencia,.VI - Viena,.DE - XETRA,.S - Zurich.*

Find out more information on Yahoo! Finance Quotes – Exchanges at *http://finance.yahoo.com/sd*

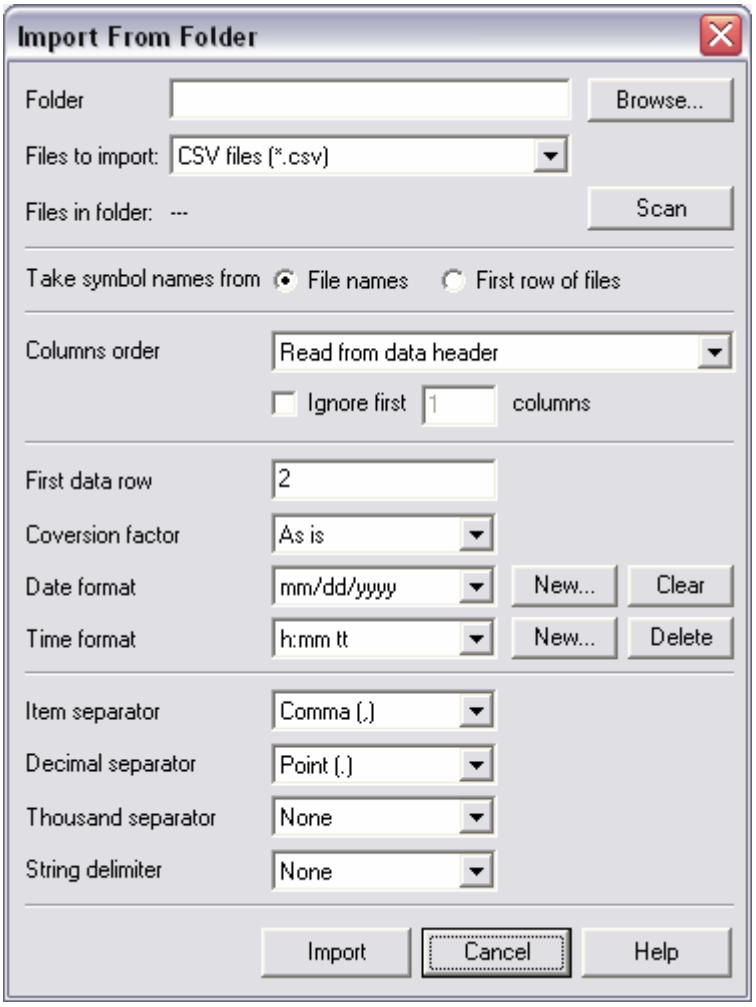
Importing Data from a Text File

To import price data for a symbol selected from a text database stored on your hard drive:

1. From the **Symbol List**, select a symbol that you want to update using data from the text database.

2. From the **File** menu, select the **Import text files**.

The *Import from folder* dialog box is displayed.



3. In the **Import from folder** dialog box, click **Browse** to browse for the folder containing the database.

   You can define some additional parameters for the file being retrieved, such as **Columns and Order**, **Data start & Formatting**, **Conversion Factor**, **Date format**, **Time Format** and **Separators**.

4. Select any of the following additional parameters, if required, or skip to step 5 of this procedure:

- The **Comma**, **Semicolon**, **Space** character or **Tab** character from the **Item separator** list.
- The **Point** or **Comma** depending on what is used in your text file, from the **Decimal separator** list.
- The **None, Comma, Quote** or **Space** character depending on what is used in your text file, from the **Thousand separator** list.
- **None, Double quote** or **Quote** depending on the way the strings are separated in your text file, from the **String delimiter** list.

5. Click **Import**.

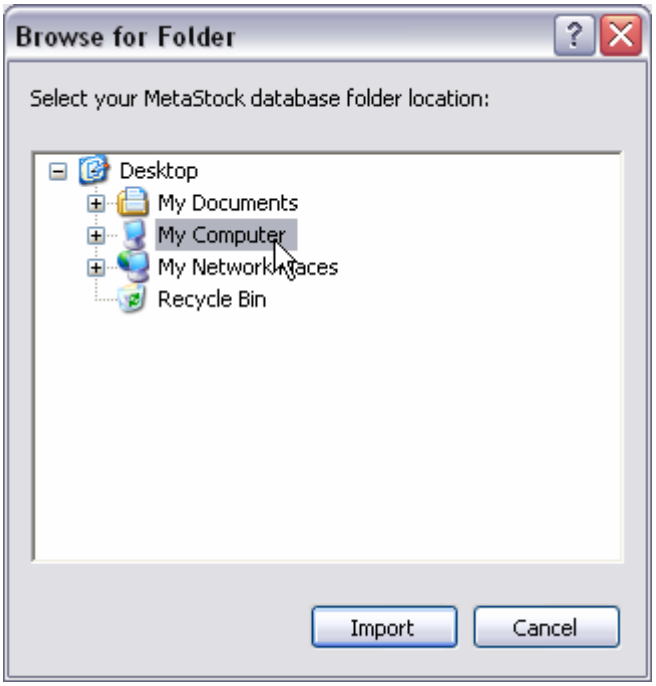
Importing MetaStock Database

Tradecision allows importing a MetaStock database.

To import a Metastock database:

1. From the **File** menu, select **Import MetaStock database**.

The *Folder's view* dialog box is displayed.



2. In the **Folders' view** dialog box, select the folder containing your MetaStock database.

3. Click **Import**.

Updating Symbols Using the Batch Update Capability

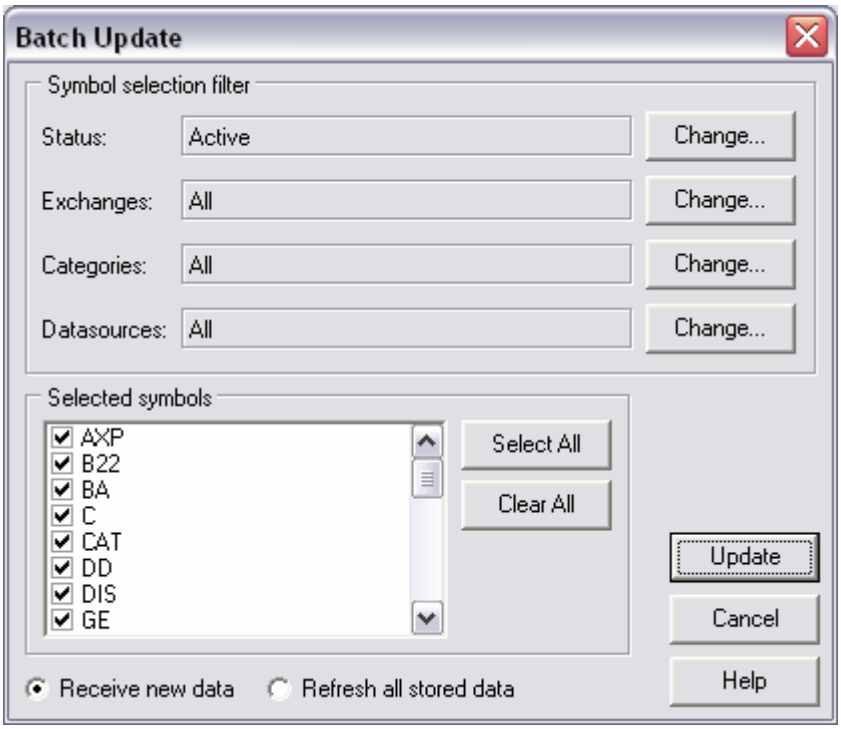
From the **Batch Update** dialog box, you can easily and quickly update any symbols to be updated.

To update the symbols:

1. Open Data Manager.

2. From the **File** menu, select **Batch Update.**

The *Batch Update* dialog box will be displayed.



3. In the Symbol selection filter, in the **Status** box, click **Change**.

4. Select the status by selecting the corresponding check box. The following options are available:

- *Active*
- *Inactive*

Note: *The Inactive status enables you to skip price data download for a symbol or group of symbols. To facilitate the selection process, you can use the* ***Select All*** *or* ***Clear All*** *buttons, if appropriate.*

5. Click **OK**.

6. In the **Exchange** box, click **Change** to select the exchange(s) you need.

7. Click **OK**.

8. In the **Categories** box, click **Change** to select **Stocks**, **Futures**, **Indices**, **Mutual Funds** or **FOREX**.

9. Click **OK.**

10. In the **Datasources** box, click **Change** to select the data source. The following options are available:
    CSI;
    IQfeed;
    MetaStock;
    Text file (.csv);
    Yahoo Finance;
    MSN;
    IB;
    TC2005;
    eSignal.

11. Click **OK**.

12. If you want to obtain new data, select **Receive new data** check box,

–OR–

If you want to update the currently stored data, select the **Refresh all stored data** check box.

13. Click **Update**.

The *Update Progress* dialog box will be displayed.

Note: *If any of the symbols have not been updated, the Tradecision-Data Manager dialog box will display information on the possible causes of the error.*

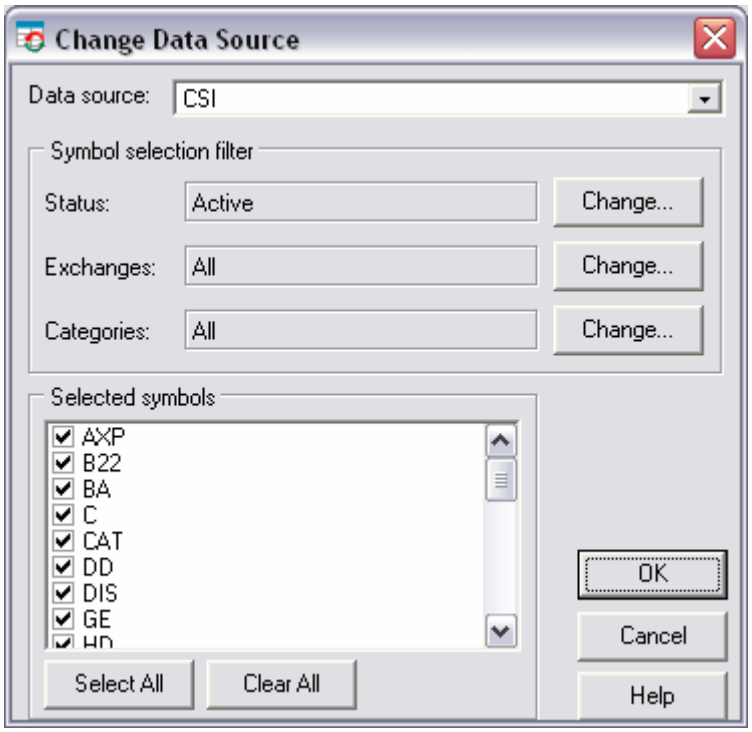
Changing Data Source for All Symbols

You can change the data source for a group of symbols or for all symbols in Data Manager, using the Global Data Source Change functionality.

To change a Data source for a group of symbols:

1. From the **File** menu, select **Global Data Source Change**.

The *Change Data Source* dialog box is displayed.



2. From the **Data Source** list in the *Change Data Source* dialog box, select the data source you need. The following options are available:

- CSI;
- IQfeed;
- MetaStock;
- Text file;
- Yahoo Finance;
- eSignal;
- MSN;
- TC2005;
- Interactive Brokers.

Note: *The* ***Symbol selection filter*** *allows selecting symbols for a data source. The symbols you selected will appear in the* ***Selected symbols*** *box. You can use the* ***Select All*** *and* ***Clear All*** *buttons to facilitate the symbol selection process, if appropriate.*

3. In the **Status** box, click **Change** to select the status. The following options are available:

- *Active*
- *Inactive*

Note: *To facilitate the selection process, you can use the* ***Select All*** *button, if appropriate.*

4. Click **OK**.

5. In the **Exchange** box, click **Change** to select the exchange(s) you need.

Note: *To facilitate the selection process, you can use the* ***Select All*** *button, if appropriate.*

6. Click **OK**.

7. In the **Category** box, click **Change** to select the category. The following options are available:

- **Stock;**
- **Futures;**
- **Indices;**
- **Mutual Funds;**
- **FOREX.**

8. In the Categories dialog, click **OK**..

9. In the *Change Data Source* dialog box, click **OK** to save the changes.

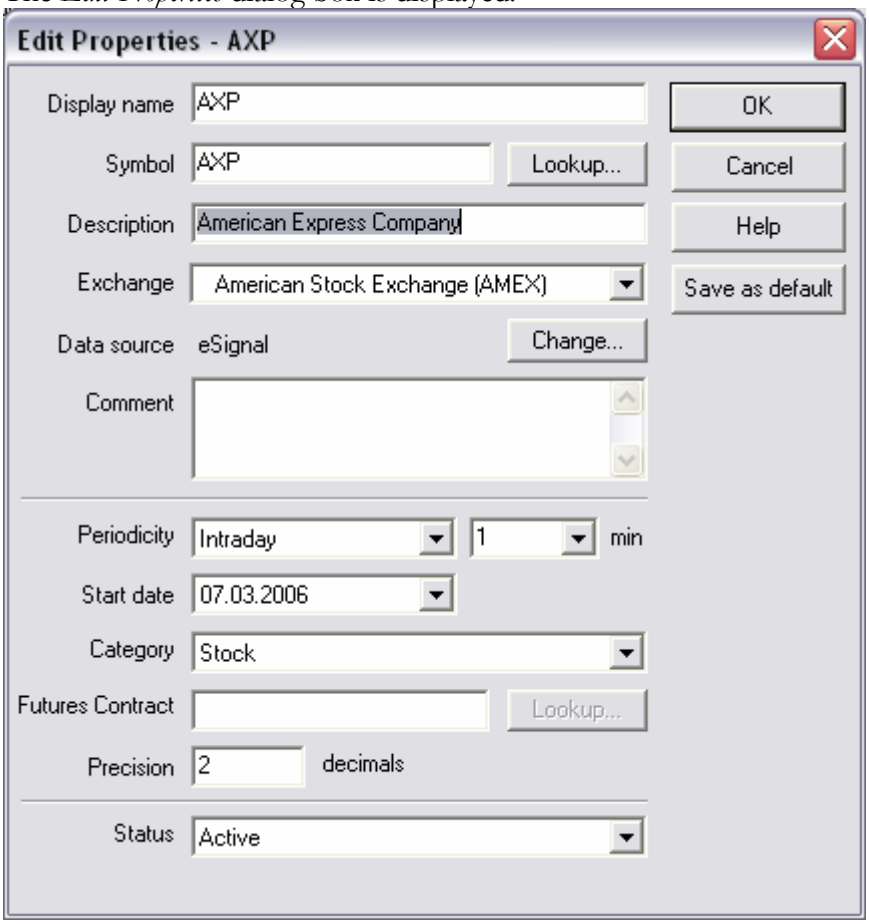
Modifying Symbol Properties

To modify the properties of a symbol:

1. From the **Symbol List**, select the symbol that you want to edit.

2. From the **Symbol** menu, select **Edit properties**.

The *Edit Properties* dialog box is displayed.



3. In the *Edit properties* dialog box, you can modify the following parameters:

- **Display name**;
- **Symbol name**;
- **Description**;
- **Data source**;
- **Exchange**;
- **Category**;
- **Futures Contract**;
- **Periodicity**;
- **Storing data range**.

4. Click **OK**.

Modifying Symbol Price Data

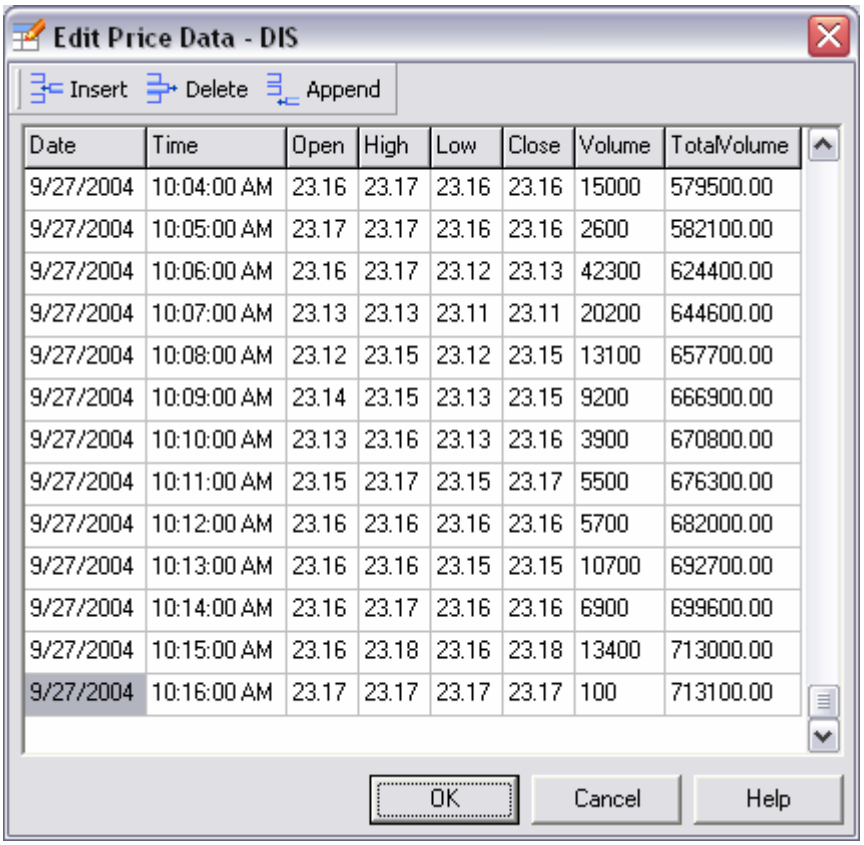
You can manually modify symbol price data (such as **Data**, **Open**, **High**, **Low**, **Close**, **Volume**, **Open Interest** and **Total Volume**).

To modify price data:

1. From the **Symbol List,** select the symbol the data for which you want to edit.

2. From the **Symbol** menu, select **Edit price data.**

The *Edit price data* dialog box is displayed.



Date	Time	Open	High	Low	Close	Volume	TotalVolume
9/27/2004	10:04:00 AM	23.16	23.17	23.16	23.16	15000	579500.00
9/27/2004	10:05:00 AM	23.17	23.17	23.16	23.16	2600	582100.00
9/27/2004	10:06:00 AM	23.16	23.17	23.12	23.13	42300	624400.00
9/27/2004	10:07:00 AM	23.13	23.13	23.11	23.11	20200	644600.00
9/27/2004	10:08:00 AM	23.12	23.15	23.12	23.15	13100	657700.00
9/27/2004	10:09:00 AM	23.14	23.15	23.13	23.15	9200	666900.00
9/27/2004	10:10:00 AM	23.13	23.16	23.13	23.16	3900	670800.00
9/27/2004	10:11:00 AM	23.15	23.17	23.15	23.17	5500	676300.00
9/27/2004	10:12:00 AM	23.16	23.16	23.16	23.16	5700	682000.00
9/27/2004	10:13:00 AM	23.16	23.16	23.15	23.15	10700	692700.00
9/27/2004	10:14:00 AM	23.16	23.17	23.16	23.16	6900	699600.00
9/27/2004	10:15:00 AM	23.16	23.18	23.16	23.18	13400	713000.00
9/27/2004	10:16:00 AM	23.17	23.17	23.17	23.17	100	713100.00

3. In the *Edit price data* dialog box, point to a cell and enter new data.

Note: *To insert a new row, click* ***Insert.*** *To delete a row, select it and click* ***Delete.*** *To add new rows, click* ***Append****.*

4. To save the changes, click **OK.**

Deleting a Symbol

To delete a symbol from the Symbol List:

1. From the **Symbol List,** select the symbol that you want to delete.
2. From the **Symbol** menu, click **Delete**.

The selected symbol will be deleted from the **Symbol List.**

Deleting Price Data

You can delete price data for a symbol without removing the symbol from the internal database.

To delete price data for a symbol without removing the symbol from the database:

1. From the **Symbol List,** select the symbol the data for which you want to delete.

2. From the **Symbol** menu, select **Clear price data**.

The price data for the selected will be deleted.

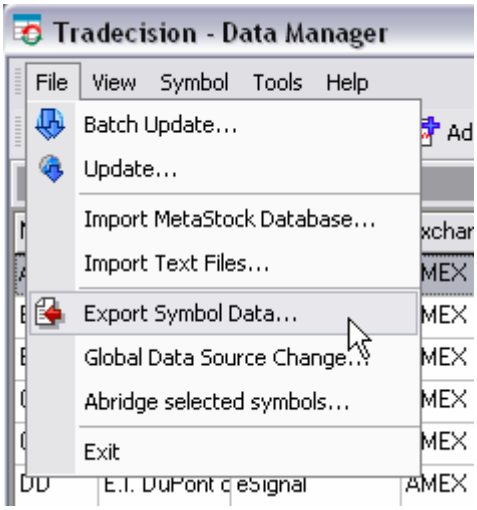
Exporting Price Data

The Alyuda system supports exporting symbol price data to files of the coma separated values type (CSV files).

To export symbol price data to a CSV file:

1. From the **Symbol List**, select the symbol the data for which you want to export.

2. From the **File** menu, select **Export Symbol Data**.



3. In the **File name** box, enter a new name for the CSV file.

4. Click **Save**.

A new file will be created and the symbol price data will be saved in the CSV format.

Note: *CSV files can be read by MS Excel.*

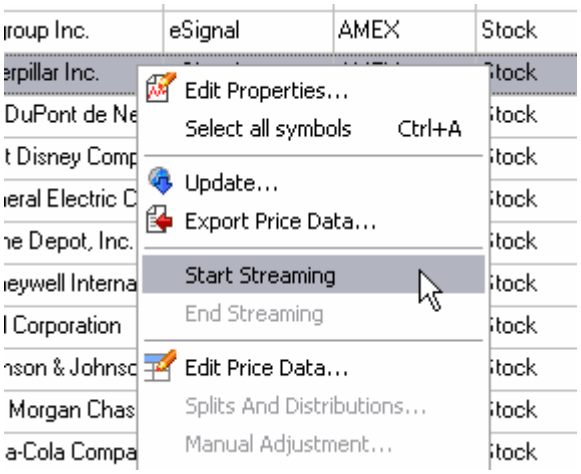
Using the Streaming Mode in Data Manager

Data Manager provides streaming mode functionality. The streaming mode capability enables receiving market data through Data Manager into Tradecision charts as soon as the data is provided by the supplying vendor.

Note: *The feature only applicable for symbols with intraday periodicity and for symbols which have CSV files as their datasource.*

To start receiving data in the streaming mode:

1. From the **Symbol List**, select a symbol or a group of symbols.
2. Right-click the selected symbol and select **Start Streaming**.



To stop receiving data in the streaming mode:

1. From the **Symbol List,** select a symbol or a group of symbols.
2. Right-click the selected symbol and select **End Streaming**.

Splits and Distributions

Understanding the Splits and Distributions concepts

Splits

The **Splits** command is used to adjust the price data and volume for a stock split.

The **Splits** lets you make an accurate comparison between a company's current price and its historical prices. Usually, splits occur when a publicly held company distributes more stock to holders of existing stock.

Stock splits

A stock split is an upgrowth in the number of outstanding company shares. For example, in a 2-for-1 stock split, every shareholder with one stock is given a supplementary share. In this way, if a company had 1 million shares outstanding before the split, it would have 2 million shares outstanding after a 2-for-1 split. Since each shareholder's equity cannot be affected by the split, the market price per share is adjusted.

Another type of split, much less common, is a **reverse split**. In a reverse split, a company takes shares from investors and then increases their price to retain market value.

Companies commonly declare stock splits to cut down the price of their stock to make it more attractive for investors and provide an indicator of company health.

Distributions

The **Distributions** command adjusts the price data for the selected symbol for a distribution. Distribution is a company's payment of cash, stock, or physical products to their shareholders. Distribution may include dividends from earnings, capital gains from sale of portfolio holdings and return of capital.

Investment management companies (i.e., mutual funds) at regular intervals distribute money that they made by trading in the shares they hold to their shareholders. These are called **distributions or dividends,** and a shareholder has to pay taxes on these payments. Fund distributions can be made by check or by investing in additional shares.

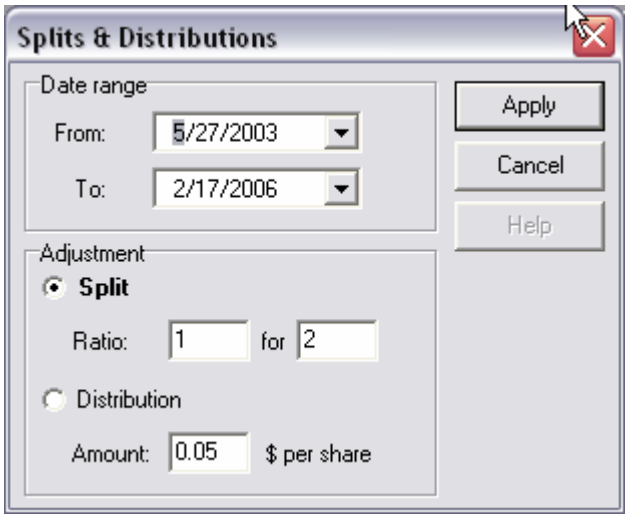
Adjusting Prices for Split or Distribution

To adjust the prices for a split or distribution:

1. From the **Symbol List**, select the symbol the price data for which you need to modify.

2. From the **Symbol** menu, select **Splits and Distributions**.

   The *Splits & Distributions* dialog box will be displayed.



3. In the **Date range** area of the *Splits & Distributions* dialog box, select the required dates.

4. In the **Adjustment** area, select **Splits** and enter the required ratio,

   -OR-

   Click **Distribution** and enter the required amount in the **Amount $ per share** box.

5. Click **Apply**.

Making Manual Adjustments

In the event that you use multiple data vendors and have to switch between those from time to time, you will have to adjust the price data manually. For example, you may need to divide the **Volume** into or multiply it by 100. In Tradecision, this can be done using the **Manual Adjustment**. Each price data field can be adjusted within a selected data range. You can select the adjustment operator (Multiply, Divide, Add, or Subtract) and edit the adjustment factor (ratio).

From the *Manual Adjustment* dialog box, the values of the following data parameters can be adjusted:

Date range. The period of time for which the relevant data must be adjusted .

Column. The column containing the data to be adjusted. You can select Open, High, Low, Close and Volume.

Operation. Select the desired operator (Multiply, Divide, Add, or Subtract) to be used for adjusting the data.

Ratio. The value for which the data in a box will be adjusted.

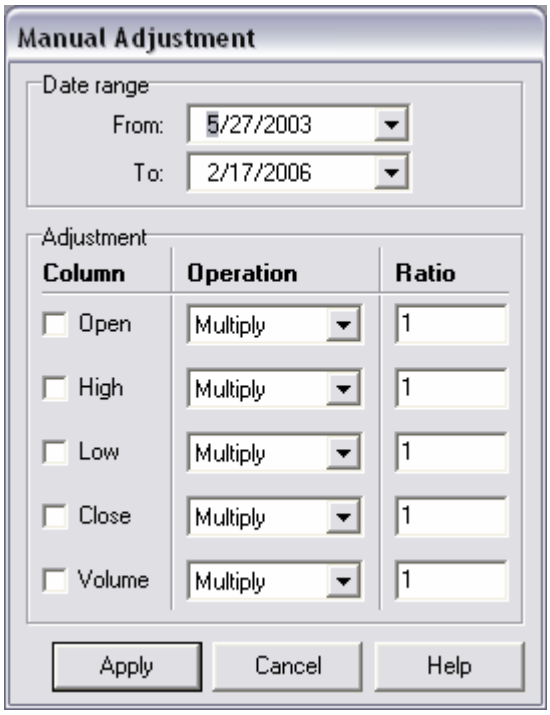
Note: *Be careful when using the* ***Manual Adjustment*** *tool. Once adjustments are made, it may be difficult to reverse the changes.*

Applying Manual Adjustments

To apply a manual adjustment:

1. From the **Symbol List**, select the symbol the price data for which you need to modify.

2. From the **Symbol** menu. select **Manual Adjustment**.



3. From the **From** and **To** lists in the *Date Range* area, select the required dates.

4. In the **Column** area, select the check boxes next to the required parameter or parameters. The following options are available:

- **Open,**
- **High,**
- **Low,**
- **Close**
- **Volume**.

5. From the corresponding lists, **Multiply, Divide, Add,** or **Subtract**.

6. In the **Ratio** text box(es), enter the required value (or values).

7. Click **Apply**.

Viewing Data in the Symbol Data Pane

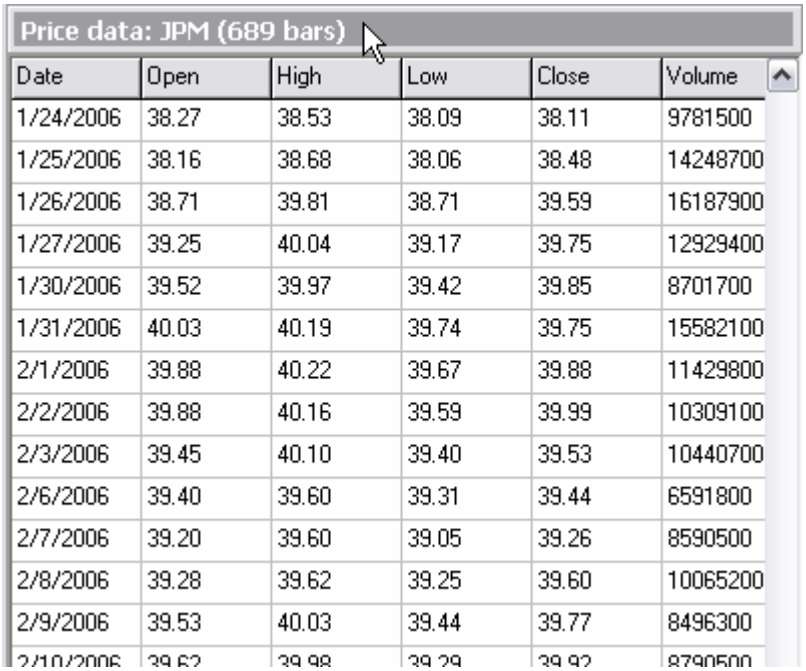
In Tradecision, symbol data can be viewed in the right pane of the main window. The price data the Alyuda system enables viewing includes Open, High, Low, Close, Volume, and Open Interest information for a specific time period.

To view symbol data:

1. From the **Symbol List**, select the symbol the price data for which you want to view.

2. From the **View** menu, select **Symbol price data**.

The **Symbol Data** pane will display the relevant data for the selected symbol in the right part of Data Manager's window.



Price data: JPM (689 bars)

Date	Open	High	Low	Close	Volume
1/24/2006	38.27	38.53	38.09	38.11	9781500
1/25/2006	38.16	38.68	38.06	38.48	14248700
1/26/2006	38.71	39.81	38.71	39.59	16187900
1/27/2006	39.25	40.04	39.17	39.75	12929400
1/30/2006	39.52	39.97	39.42	39.85	8701700
1/31/2006	40.03	40.19	39.74	39.75	15582100
2/1/2006	39.88	40.22	39.67	39.88	11429800
2/2/2006	39.88	40.16	39.59	39.99	10309100
2/3/2006	39.45	40.10	39.40	39.53	10440700
2/6/2006	39.40	39.60	39.31	39.44	6591800
2/7/2006	39.20	39.60	39.05	39.26	8590500
2/8/2006	39.28	39.62	39.25	39.60	10065200
2/9/2006	39.53	40.03	39.44	39.77	8496300
2/10/2006	39.62	39.98	39.29	39.92	8790500

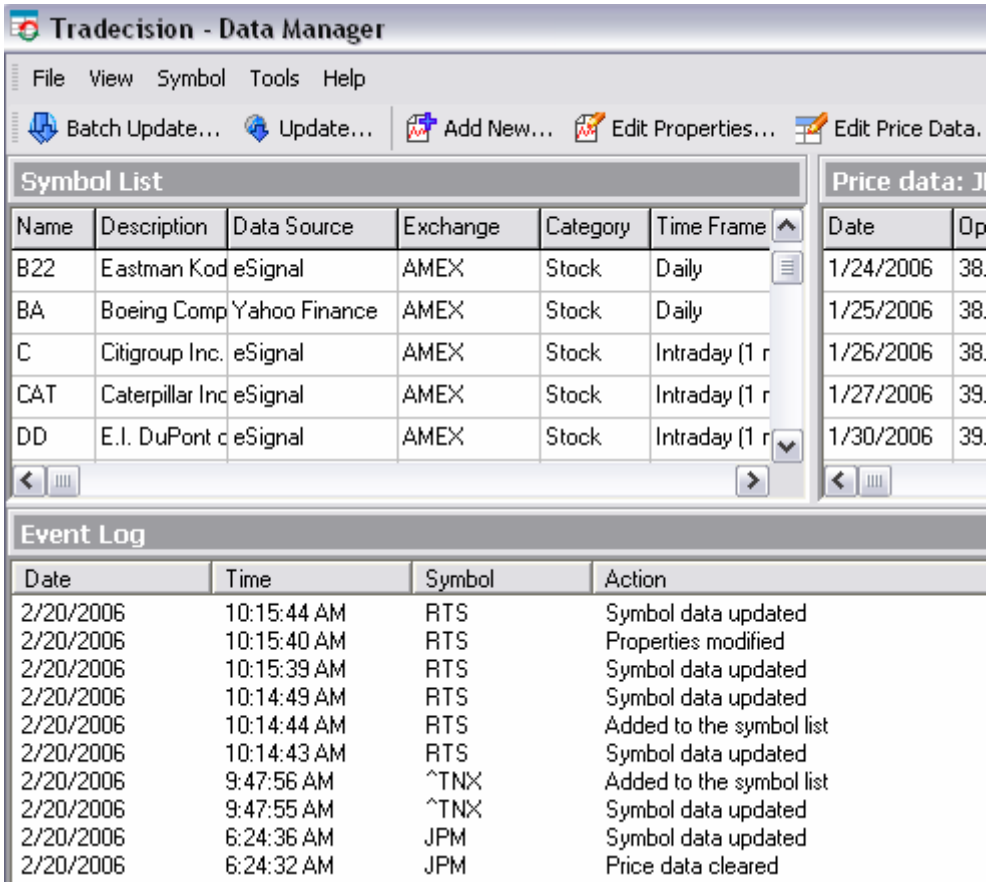
Viewing Event Log File

The most important actions performed by the user are automatically saved by Data Manager. The **Event Log** file containing the saved actions can be retrieved and viewed.

To view the Event Log file:

1. From the **View** menu, select **Event Log.**

The **Event Log** pane will be displayed at the bottom of the Data Manager window.


Tradecision - Data Manager
File View Symbol Tools Help
Batch Update... Update... Add New... Edit Properties... Edit Price Data.
Symbol List
Price data:
Name Description Data Source Exchange Category Time Frame
B22 Eastman Kod eSignal AMEX Stock Daily
BA Boeing Comp Yahoo Finance AMEX Stock Daily
C Citigroup Inc. eSignal AMEX Stock Intraday (1 r
CAT Caterpillar Inc eSignal AMEX Stock Intraday (1 r
DD E.I. DuPont c eSignal AMEX Stock Intraday (1 r
Date Op
1/24/2006 38.
1/25/2006 38.
1/26/2006 38.
1/27/2006 39.
1/30/2006 39.
Event Log
Date Time Symbol Action
2/20/2006 10:15:44 AM RTS Symbol data updated
2/20/2006 10:15:40 AM RTS Properties modified
2/20/2006 10:15:39 AM RTS Symbol data updated
2/20/2006 10:14:49 AM RTS Symbol data updated
2/20/2006 10:14:44 AM RTS Added to the symbol list
2/20/2006 10:14:43 AM RTS Symbol data updated
2/20/2006 9:47:56 AM ^TNX Added to the symbol list
2/20/2006 9:47:55 AM ^TNX Symbol data updated
2/20/2006 6:24:36 AM JPM Symbol data updated
2/20/2006 6:24:32 AM JPM Price data cleared

To clear the Event log pane:

1. From the **View** menu, select **Clear event log**.

Changing Yahoo and Interactive Brokers Settings

To configure settings used by the in-built Yahoo downloader:

1. From the **Tools** menu, select **Preferences >** *Yahoo Finance*.

   The *Yahoo Finance* tab is displayed.

2. If you would like to use proxy server, do the following:

   a). Select the **Use proxy server** check box;

   b). Enter the IP address and port parameters in their corresponding boxes;

   –OR–

   If you do not want to use the proxy server, skip to Step 3 of this procedure.

   Note: *If you want prices for splits and distributions to be automatically adjusted while being downloaded from Yahoo Finance, select the* ***Adjust downloaded price*** *check box.*

3. Click **OK**.

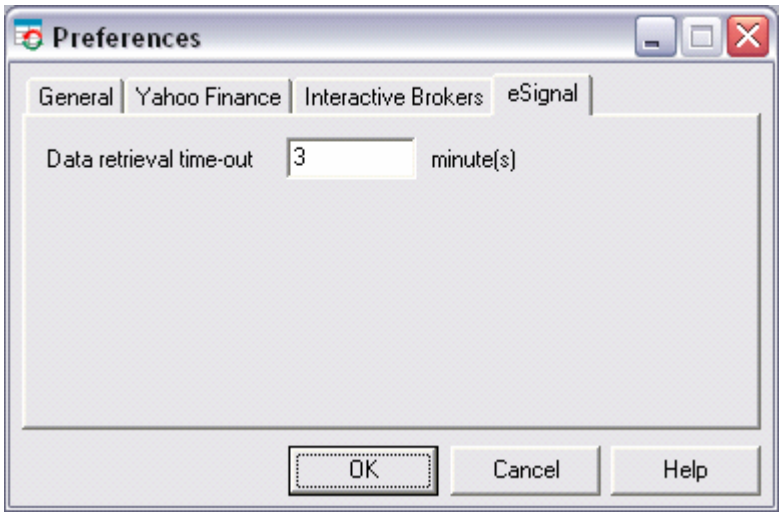
Setting Connection Parameters for eSignal

You can set the timeout for eSignal DataSource. This parameter defines the period of time (in minutes) during which DataManager expects a response to its queries from eSignal.

To set the connection parameters:

1. In Data Manager, select **Tools**>**Preferences**.

   The *Preferences* window is displayed.



2. Select the **eSignal** tab.

3. In the **Data Retrieval Timeou**t box, set the required value and click **OK**

To configure specific Interactive Brokers preferences:

1. Open Data Manager.

2. Go to the **Tools** menu.

3. From the **Tools** menu, select **Preferences** > the *Interactive Brokers* tab.

The *Interactive Brokers* enables viewing the state of connection between Data Manager and Interactive Brokers. If the connection indicator is green, the connection has been duly established and you can start collecting market data. If the indicator is red, an error has occurred. If is the indicator is yellow, Data Manager is currently trying to connect to IB.

4. In the **Connection Properties area**, enter the following connection parameters:

Address. In case TWS is started from a local PC, you can leave the box empty. If TWS is located on a remote machine, you enter the IP address of this remote computer.

Port. The port should be the same as in **TWS > Configure >API > Socket Port**.

Client ID. If TWS is accessed by several concurrent users, each of these users needs a unique Client ID. If there is only one user, the default value can be used.

5. If you want data from TWS to be automatically collected and saved, select an appropriate period from the **Autosave period** list or skip to Step 6 of this procedure.

6. Click **OK**.

Note: If you would like to monitor your interaction with Interactive Brokers by viewing messages provided by the application, you can use the Show Messages capability in the ***Preferences*** *tab.*

MSN Money Data Support

Tradecision enables you get free end-of-day stock quotes from MSN Money data provider (http://moneycentral.msn.com). To find a list of the symbols provided by MSN Money, visit http://moneycentral.msn.com/investor/common/find.asp

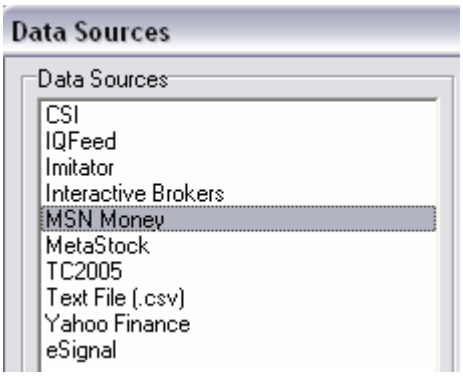
To receive market data from this data source in Data Manager, you will need to indicate the MSN Money in the selected symbol's properties. You can also change all your symbols stored in Data Manager to this data provider with just a few clicks.

Defining MSN Money as the Datasource for a New or Existing Symbol

- On the Data Manager's toolbar, click **Add New** or **Edit Properties**.

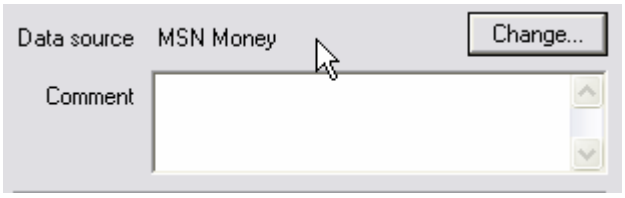
Depending on the option selected, the *Add New* or *Edit Properties* dialog box is displayed.

- In the *Add New* or *Edit Properties* dialog box, click **Change** next to the **Data source** box and then, in the appeared *Data Sources* window, select **MSN Money** and click **OK**.



- In the *Add New* or *Edit Properties* dialog box, click **OK**.

MSN Money is now set as the primary data source for the symbol.



Changing All Existing Symbols to MSN Money

If you need to set the **MSN Money** data source for all the symbols that you currently have in Data Manager, go to **File** > **Global Data Source Change**. In the *Change Data Source* dialog box, select **MSN Money** and click **OK**.

Futures Symbols Manager

Understanding Futures Symbols Manager

The Futures Symbols Manager enables you specify the settings of futures' symbols you have on the Data Manager Symbol List. This tool can be used when you need to assign Point Value and Margin to futures symbols in relation to their contract specifications. Tradecision will use the data that you provide in Futures Symbols Manager for of its builders. For example, when you need to backtest a strategy on a futures symbol, Simulation Manager will read the symbol's point value and margin value from Futures Symbols Manager.

To using Futures Symbols Manager:

1. Open **Data Manage**r.

2. From the **Tools** menu, select **Futures Symbols Manager**.

3. In the **Future Symbols Manager** dialog box, change the values of **Futures Contract**, **Exchange, Margin** and **Point Value** boxes for the selected symbol, if required.

4. Select the **Insert**, **Delete** or **Append** options for adding / removing columns, if required.

Note: *If you add a column in Future Symbols Manager, it does not mean that you have added a new symbol entry in Data Manager (to the Symbol List).*

5. Click **OK**.

Note: *In the* ***Point value*** *column, you can only enter integer numbers which are greater than zero. Keep it in mind that the values in the* ***Symbol*** *column should not to be the same. Point Value stands for the amount of profit generated by 1 contract for a 1 point increase in price.*

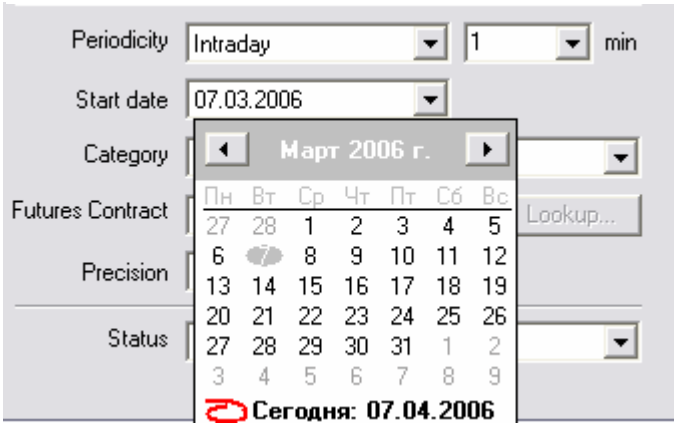
The data from Futures Symbols Manager is stored in the **FutureContract .csv** file, located in **C:\Program Files\Alyuda Tradecision\Data\DM**.

Data Storing Capabilities

Up to Tradecision 2.1 inclusive, one can enter the storing data values for a symbol using the **Bars to store** option in the *Add New Symbol* or *Edit Properties* dialogs boxes of Data Manager. When new data for a symbol arrives with, for example, a 10-day storage period specified, the data for the first day is deleted as soon as the data for 11-th day arrives. This caused some problems in the application's functioning in the streaming mode, as Tradecision recalculates each technique inserted into the chart instead of calculating the techniques for the new bars only.

Using the Start Date option

When you add a new symbol using the *Add New Symbol* dialog box or edit an existing symbol with from the *Edit Properties* dialog box, you can enter the first date to start receiving data for the given symbol using the *Start date* box.



***Note**: For intraday symbols, the entered value contains only the date and the time is not calculated.*

Abridging Symbols in Data Manager

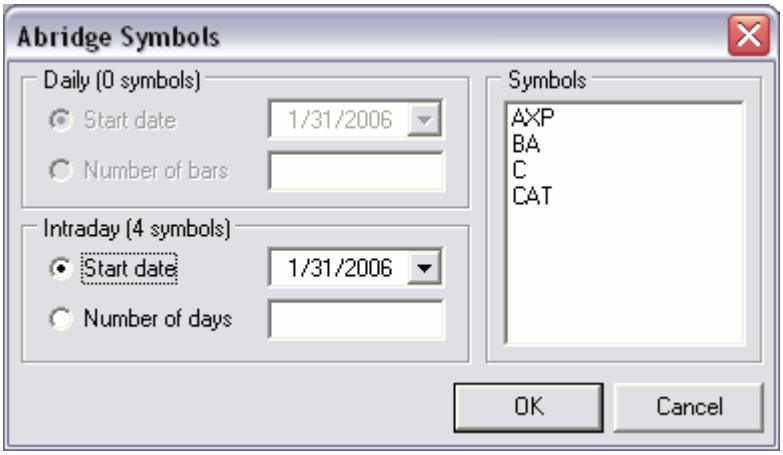
You can abridge selected symbols in Data Manager with just a few clicks.

To abridge selected symbols:

1. In Data Manager, select the symbol or symbols whose data you want to abridge.

2. From the **File** menu, select **Abridge selected symbols**.

The *Abridge Symbols* dialog box will be displayed.



3. Select **Daily** or **Intraday** periodicity and then define **Start date** or **Number of days/bars** by selecting the corresponding options.

4. Click **OK**.

Note: *You will need to restart Data Manager to allow the changes take effect.*

Limiting the Symbol Data Size

During your trading work with Tradecision, a large amount of market data is accumulated in Data Manager. Sometimes, using such a large volume of data may lead to slow operation of the application.

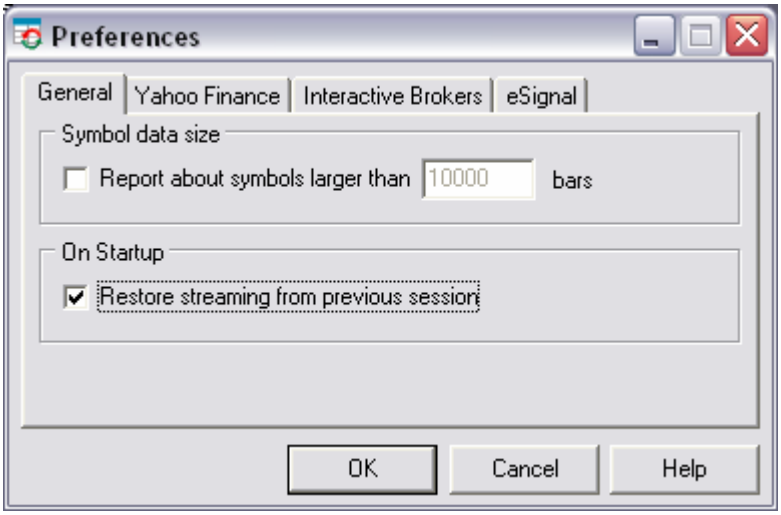
For example, when you open several charts with 100,000 bars each, insert a number of strategies and analytical studies and receive new data in the streaming mode that will significantly slow down Tradecision's performance.

To limit the data size of those symbols which you believe to have exceeded a reasonable number of bars:

1. Open Data Manager.

2. From the **Tools** menu, select **Preferences**.

   The *Preferences* dialog box will be displayed.



3. In the **General** tab, select the **Report about symbols larger than … bars** check box.

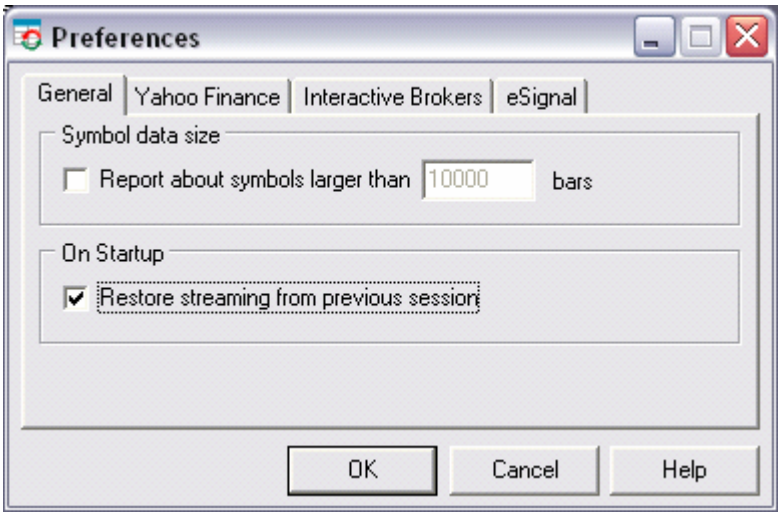
4. Enter the value you need.

If you selected the check box and entered a value, each time before closing, Data Manager will check the symbols' size. If it finds that for some of the symbols the limit is exceeded, you will receive a warning message and the **Abridge selected symbols** dialog box will be displayed. Using the functionality in the dialog box, you can abridge selected symbols to the size you need. Otherwise, if you do not want to abridge the symbols, you need to click **Cancel**. After that, Data Manager will be closed and the symbols will remain as they are.

5. Click **OK**.

Restoring Streaming Mode from Previous Session

Data Manager can automatically activate streaming when the application is launched. To activate this function, go to the *Preferences* window (**Tools -> Preferences…**) and select the **Restore streaming from previous session** option in the window's **General** tab.



Data Manager will automatically activate streaming when the application is launched for those symbols, for which streaming was activated during the previous session.

Exchange Management

If the exchange you need is not included in the **Exchange** list of Data Manager, you can add it manually using the **Tools** menu.

To add an exchange manually:

1. From the **Tools** menu of Data Manager, select **Exchanges**.

   In the *Exchange Management* dialog will be displayed.

2. Click **Add**.

   The *Add Exchange* dialog will be displayed.

3. Fill in the corresponding fields and click **OK**.

4. *In the Exchange Management* dialog, click **OK**.

   ***Note**: The exchange you use must contain a Session Time for Data Manager to be able to receive market data.*

Holiday Management

The Holiday Management functionality provided by the Data Manager allows adding and editing holiday lists for different exchanges. To assign a holiday list to a specific exchange, use the Exchange Management functionality.

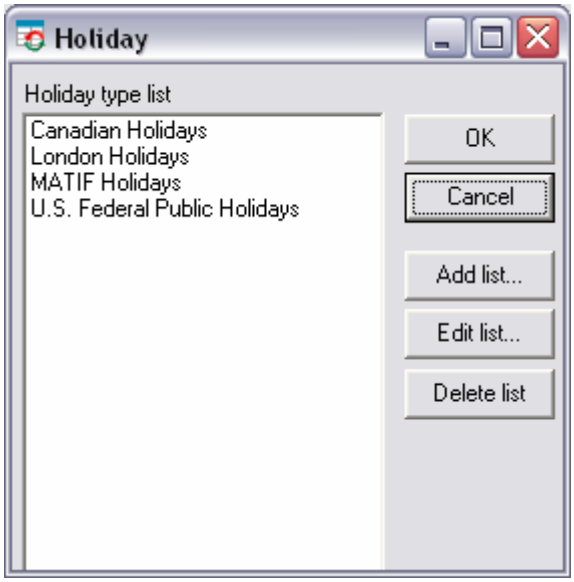
Adding a Holiday List

To add a holiday list:

1. Open Data Manager.

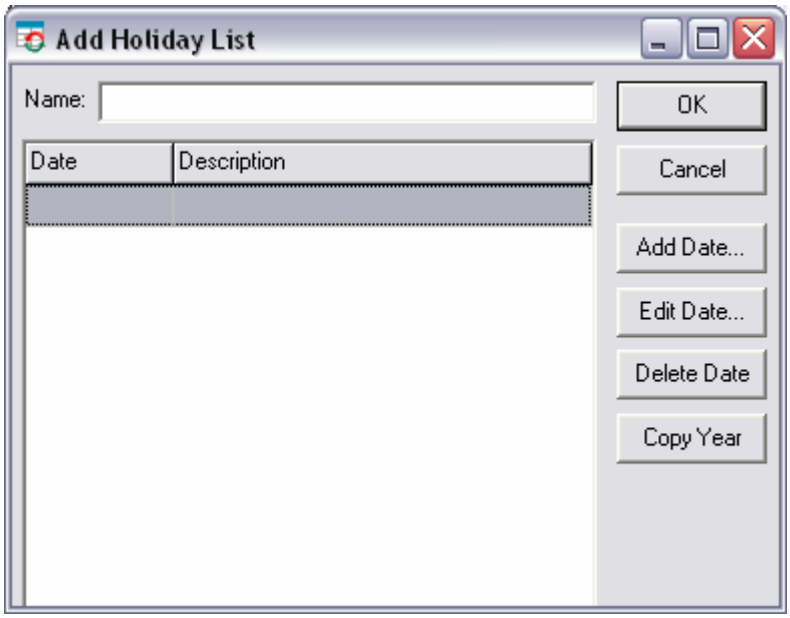
2. From the Data Manager **Tools** menu, select **Holidays...**

The *Holiday* window is displayed.



3. In the *Holiday* window, click **Add List...**

The *Add Holiday List* window is displayed.



4. In the **Name** box of the *Add Holiday List* window, enter the name of the holiday list being added.

5. To add the date of the holiday, click **Add date….**

The *Add holiday description* dialog box will be displayed.

6. In the corresponding boxes of the *Add holiday description* dialog box, enter the date of the holiday to be added and a description for it.

***Note**: In a similar manner, enter the data for all the holidays that are to make up the holiday list being added.*

7. Click **OK**.

The new holiday will be added to the hoilday lists' in the *Hoilday* window.

Editing a Holiday List

To edit a holiday list:

1. Open Data Manager.

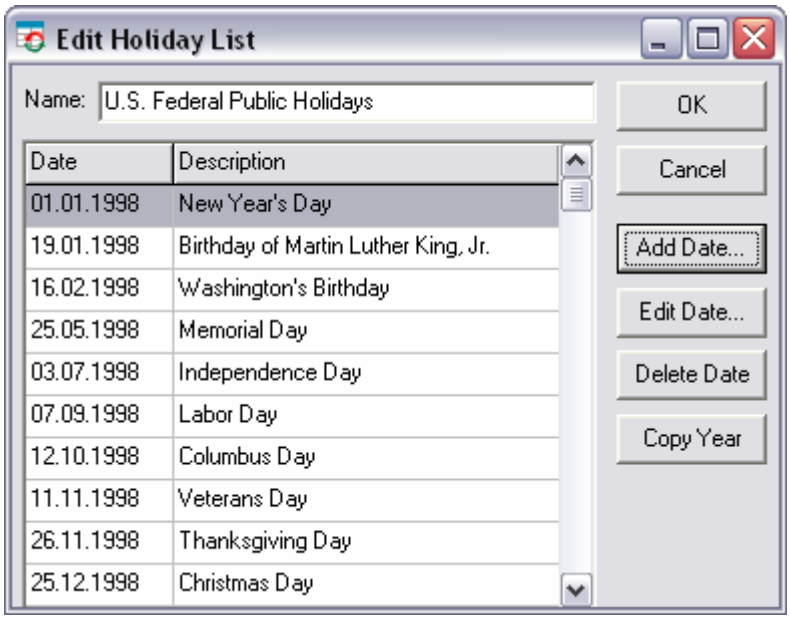
2. From the Data Manager **Tools** menu, select **Holidays...**

The *Holiday* window is displayed.

3. From the holiday lists in the *Holiday* window, select and click the holiday list that you want to edit.

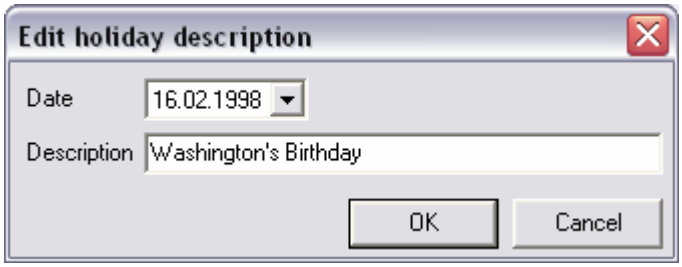
4. Click **Edit List**…

The *Edit Holiday List* window is displayed.



4. From the list of holiday lists in the Edit Holiday List window, select the holiday that you want to edit and click **Edit Date**…

The *Edit holiday description* dialog box is displayed.



Edit the date and/or description of the holiday as appropriate and click **OK**.

Chapter 4

Charting

Charting being the basis of technical analysis, Tradecision provides a powerful set of essential tools to organize and analyze your charts in way you like.

Charts overview

What are charts?

A chart is a graphical image of a security. The word "security" applies to any tradable financial implement or quantifiable index e.g. stocks, commodities, bonds, futures or market indices. Any security with price data over a period of time can be used to build a chart.

A price chart is a series of prices plotted over a specific time interval. On the chart, the y-axis (vertical axis) represents the price scale and the x-axis (horizontal axis) depicts the time scale. Prices are plotted from left to right across the x-axis with the most up-to-date plot being the furthest right.

Each chart can be customized with studies, lines, indicators, text, colors, bar spacing, and time frames. In Tradesicion chart data can be readily analyzed, edited, deleted, zoomed and saved to ASCII files.

Technical analysts employ charts to analyze a wide set of securities and forecast future price movements.

What is technical analysis?

Technical analysis researches past price changes to predict future price movements. For analysis purposes technical analysts rely almost solely on charts. Technical analysis is applicable to stocks, commodities, indices, futures, or any tradable instrument where the price is influenced by supply and demand. Price concerns to any combination of the open, high, low or close for a given security over a specific timeframe. The time frame can be based on intraday (tick, 5-minute, 15-minute or hourly), daily, weekly or monthly price data and last a few hours or many years. Besides, some technical analysts include volume or open interest figures with their study of price action.

The use of charts is not bounded by just technical analysis. Because charts provide an easy-to-read graphical representation of security price movement over a specific time period, they can also be of great use for fundamental analysts.

The chart is the basis of technical analysis, and over the years, many various types of charts have been developed.

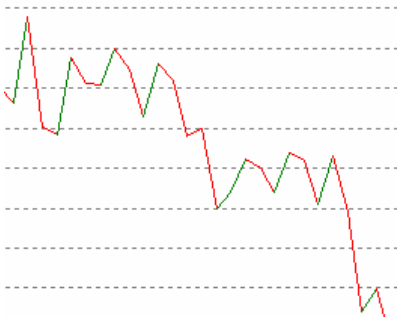
There are four most popular ways of displaying price data: line chart, bar chart, candlestick chart and point & figure chart.

Chart types

Below you can find the description of the most popular chart types:

Line Chart

This is one of the simplest sorts of charts. It is formed by plotting one price point, usually the close, of a security, over a time interval. Connecting the dots, or price points, over a period of time, creates a line. Some investors and traders consider the closing level to be more significant than the open, high or low.



By paying attention to only the close, intraday swings can be ignored. Line charts are also used when open, high and low data points are not available. Sometimes only closing data are available for certain indices, thinly traded stocks and intraday prices.

Bar Chart

A **bar** is one unit of data. For daily data, a bar represents the data for a single trading day.

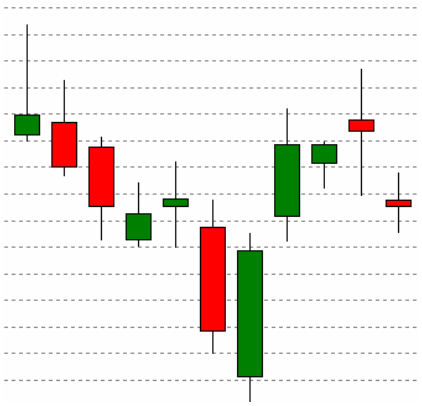
A bar chart is a graphic display of an issue's performance over a period of time. A bar chart is used to plot price movements using vertical bars indicatory price ranges. A bar chart is the beginning for all indicators and studies. Each bar represents a specific time interval, such as one day, one week, or one month.

The bottom of the bar starts at the lowest issue trade price in that time interval and the top of the bar ends at the highest price. In addition, there are two smaller horizontal bars pointing to the left and right. The bar pointing to the left indicates the opening price for the issue and the bar pointing to the right shows the closing price. The prices of the bar coincide with the scale found on the right side of the bar chart.

Candlestick Chart or Japanese Candlesticks

Developed by the Japanese in the 1600's (in that time the Japanese began using technical analysis to trade rice), a candlestick chart in many respects is alike the bar chart. The major distinction is the graphical description of each period in a candlestick.

Major Candlestick Chart Formations: Gravestone Doji, Dragon-fly Doji, Abandoned Baby Doji, Harami Cross, Engulfing Pattern, Evening Star, Dark Cloud Cover.



A candlestick consists of an upper shadow, lower shadow and the body.

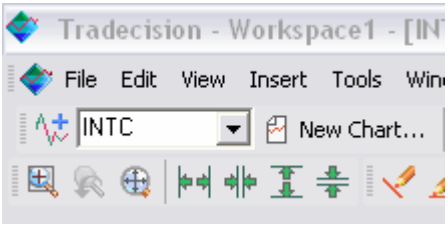
The candlestick is formed from the open, high, low and close prices of a specific time period. Each candlestick represents one period of data (minute-day-week-month).The color of the candlestick is determined by the interrelation between the open and close. If the close is higher than the open, a white real body is formed. If the close is lower than the open, a black real body is formed.

The thin lines above and below the real bodies represent the high and the low for the period and are referred to as shadows. The high for the period is the upper shadow and the low is the lower shadow. Due to these shadows, which look like wicks on a candle, the term "candlestick" appeared.

Candlestick charts clearly illustrate the supply and demand concepts. The advantage of candlesticks is the ability to highlight trend weakness and reversal signals that may not be visible on a bar chart. A trader can compare the relationship between the open and close as well as the high and low.

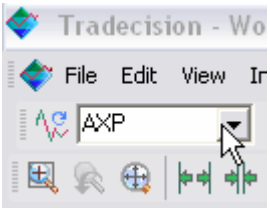
Working with Charts

There are several ways to create a new chart in Tradecision. You can use the **Symbol Box** or the **New Chart** command.



Opening a New Chart Using the Symbol Box

The **Symbol Box** is located on the main toolbar**.** In this box, you can enter a symbol name to open a new chart. The most recently used symbols are remembered in in the drop-down list.



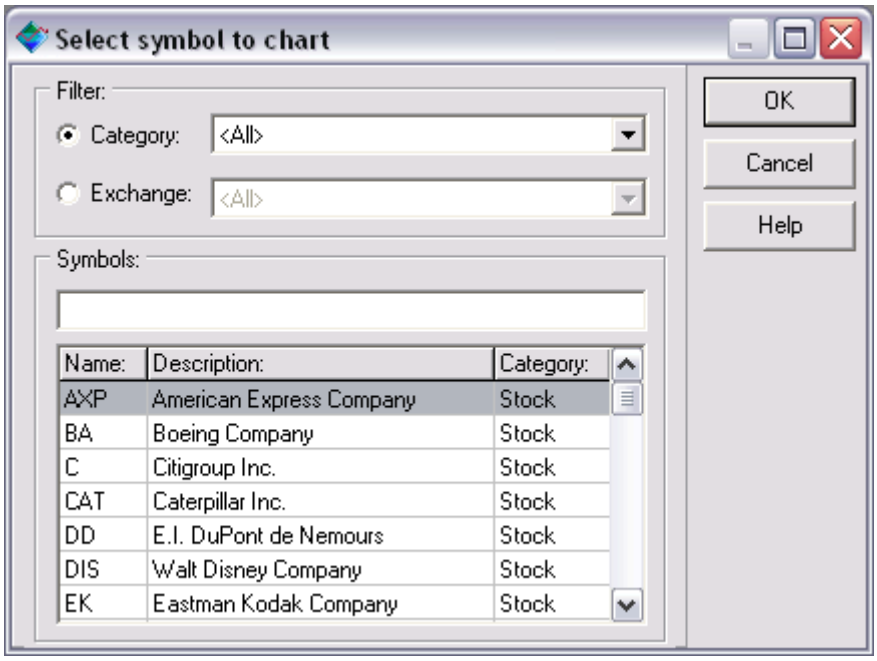
Note: *Using the* ***Symbol Box*** *you can not only open a new chart but also create a corresponding symbol in Data Manager. The new chart and symbol will use the same properties (data source, periodicity, and so on.) as those you indicated in Data Manager using the* ***Save As Default*** *command. This command can be found in the* ***Add New Symbol*** *and* ***Edit Properties*** *dialogs.*

Creating a New Chart using the New Chart Command

To create a new chart:

1. From the **File** menu, select **New Chart**.

   The *Select symbol to chart* dialog box will be displayed.



2. In the **Symbol** box, enter or select the symbol that you want to chart.

3. Click **OK**.

   To speed up the symbol selection process, you can filter the list of the available symbols by category or by exchange.

To use the category filter:

1. Under **Filter,** select the **Category** check box.
2. From the list, select stocks, futures, index, options or mutual funds.
3. Enter or select from the list a symbol in the **Symbol** box.
4. Click **OK**.

To use the exchange filter:

1. Under **Filter,** select the **Exchange** check box.
2. From the list, select the exchange you need.
3. Enter or select from the list a symbol in the **Symbol** box.
4. Click **OK**.

Chart-Opening Option

Using this functionality, you can open new charts within an active chart window without the need to close the chart window itself. This means that you can change a symbol on the active chart once the chart is opened. For example, if you want to take a look at 100 charts, you will not have to open and close 100 windows.

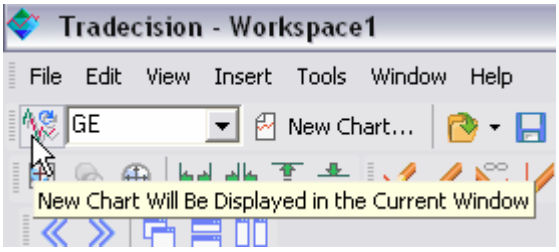
> ***Note**: You can open multiple charts in a single workspace. However, only the chart that has an active chart title is considered as the active one. Also, the active chart is ticked at in the Window menu.*

To open another chart in the active chart window:

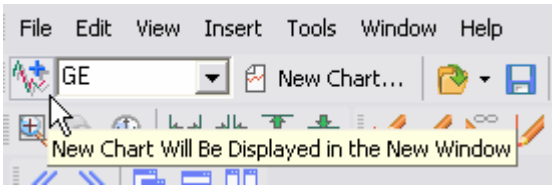
1. Open a chart.

Next to the **Symbol Box,** you the **Chart Opening** icon is located. The icon has two different views that can be changed with a mouse-click:

a) The **arrow** in the icon means that the new chart will be displayed in the active (current) chart window.


Tradecision - Workspace1
File Edit View Insert Tools Window Help
GE
New Chart...
New Chart Will Be Displayed in the Current Window

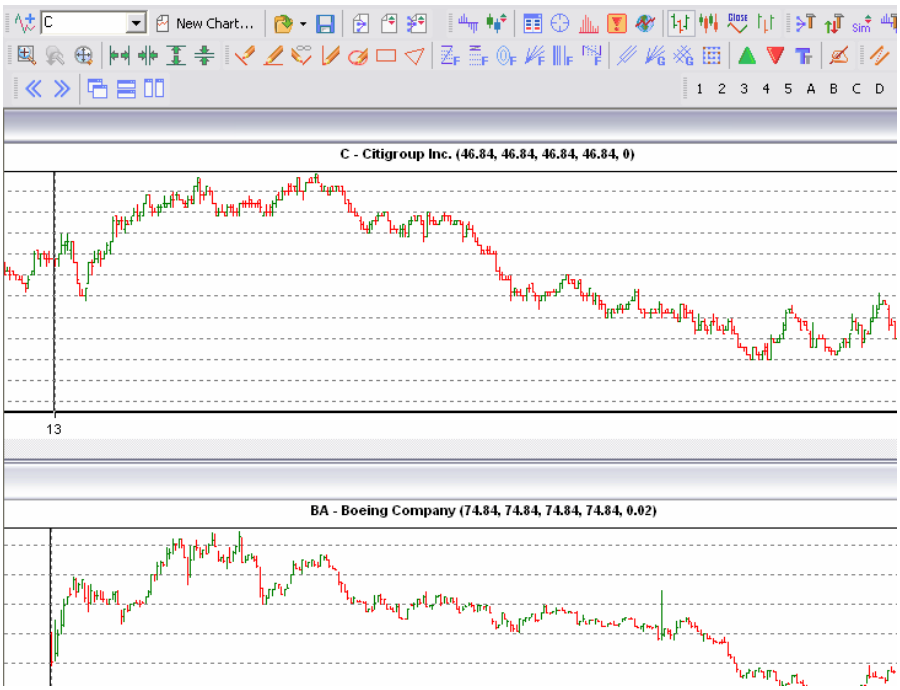
b) The **plus** in the icon means that the new chart will be displayed in a new chart window.



2. Select the **Arrow** option.

3. In the **Symbol Box** on the main toolbar**,** enter a symbol name.

The new chart will be opened in the same chart window.

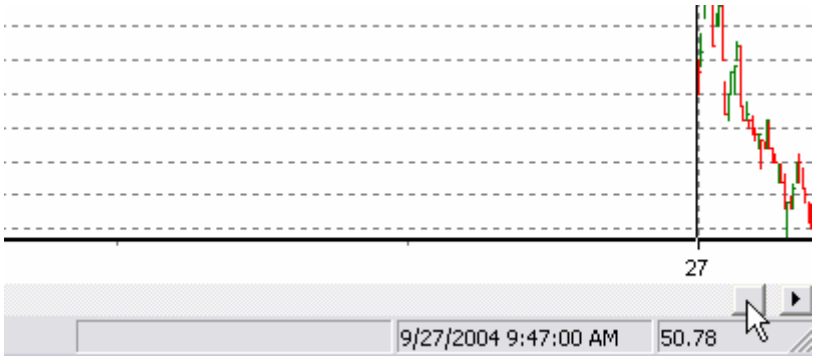

C
New Chart...
1 2 3 4 5 A B C D
C - Citigroup Inc. (46.84, 46.84, 46.84, 46.84, 0)
13
BA - Boeing Company (74.84, 74.84, 74.84, 74.84, 0.02)

Scrolling a Chart

The horizontal scroll bar is situated at the bottom of a chart. Using this scroll bar allows you to move through the price chart.

To scroll through the chart:

1. Drag the scroll box forward or backward to move through the chart.



–OR–

Click the left scroll arrow to scroll backward through the chart, and click the right scroll arrow to scroll forward through the chart.

Using Chart Time Frames

To change the chart time frame:

1. From the **View** menu, point to **Time Frame** and then select the time frame.

The following options are available:

- Minute;
- Daily;
- Weekly;
- Monthly.

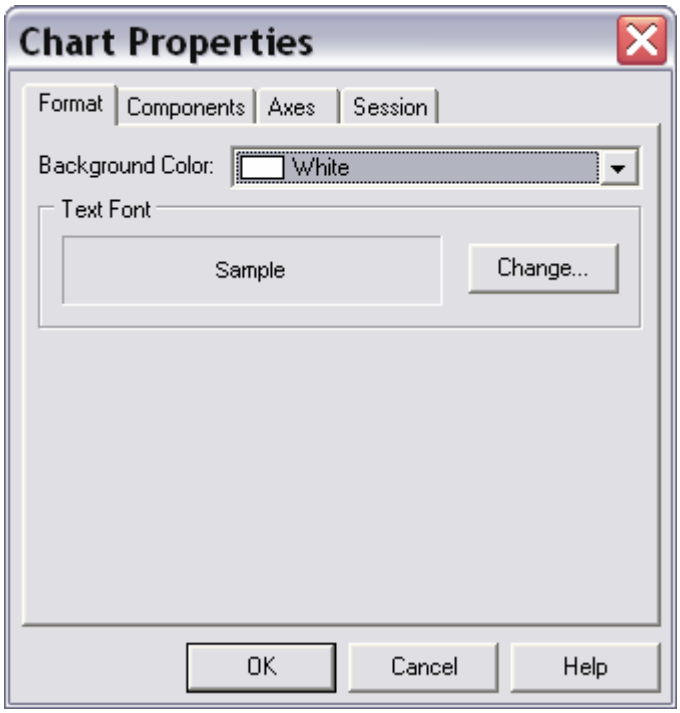
Customizing Charts

You can customize a number of properties and elements in a chart, such as the color of its background, the font, chart grid, title, scrollbar, day break markers and axes.

To modify the properties of a chart:

1. Double-click the background of the chart.

The *Chart Properties* dialog box will be displayed.

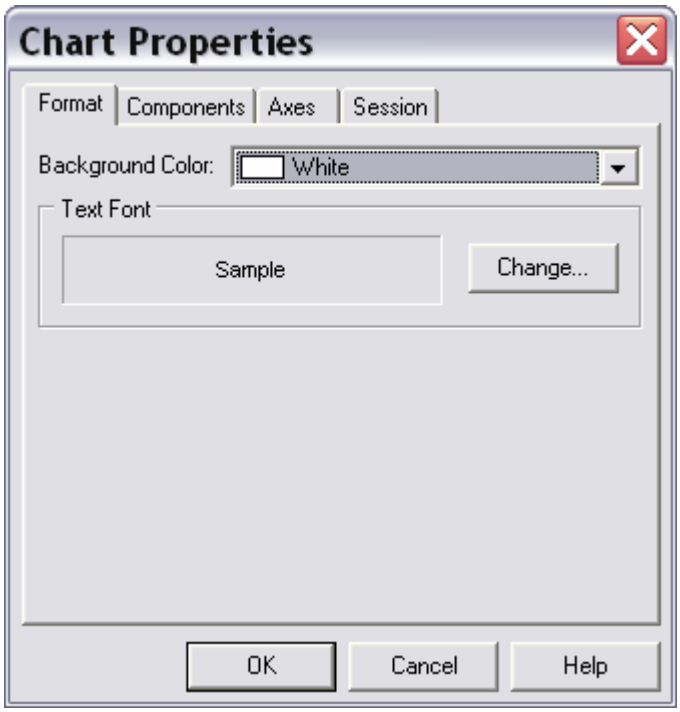


Changing the Background Color

To change the background color of the entire chart:

1. Double-click the background of the chart.

   The *Format* tab of the *Chart Properties* dialog box will be displayed.



2. From the **Background Color** list in the *Format* tab, select the color you that you want to use.

3. Click **OK.**

Changing the Font

To change the font of the text of the chart's heading and y-axis numbers:

1. Double-click the background of the chart.

   The *Format tab* of the *Chart Properties* dialog box will be displayed.

2. Under **Text Font group box** in the **Format** tab, click **Change** and then select the text font that you want to use.

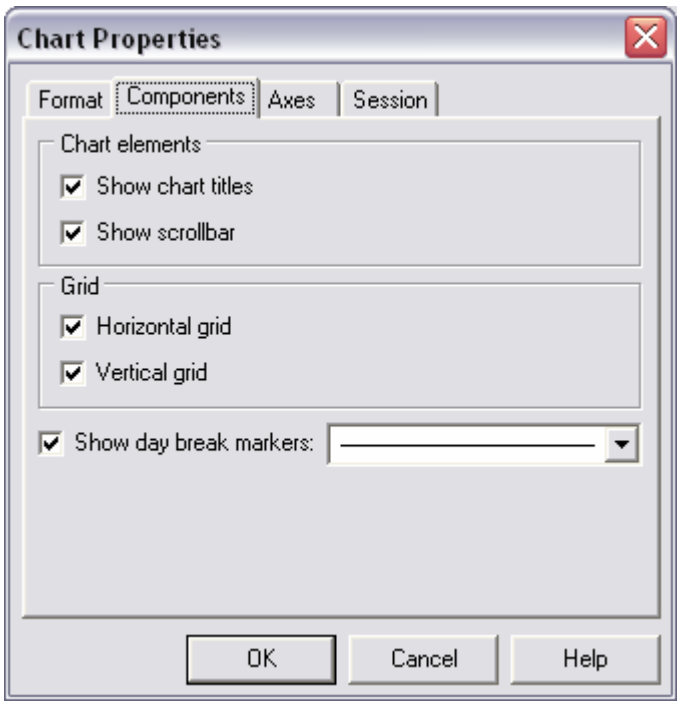
3. Click **OK.**

Changing the Chart Titles and Scrollbar Options

Using these options you can save space in your workspace.

1. Double-click the background of the chart.

   The *Chart Properties* dialog box will be displayed.



2. In the *Chart Proprties* dialog box, select the *Components* tab.

3. In the *Chart elements* group box of the *Components* tab select or clear the **Show chart titles** and/or **Show scrollbar** check boxes.

4. Click **OK**.

Enabling and Disabling the Chart Grid

The **Grid** feature is a method of visually distinguishing between different prices and dates in a chart. The Grid feature is not an indicator or study**.**

To enable the Grid capability:

1. Double-click the background of the chart.

   The *Chart Properties* dialog box will be displayed.

2. In the **Grid** area of the *Components* tab, select the **Horizontal Grid** and/or **Vertical Grid** check box.

3. Click **OK.**

Displaying Day Break Markers

To display day break markers:

1. Double-click the background of the chart.
2. The *Chart Properties* dialog box will be displayed.
3. In the *Chart Properties* dialog box, select the *Components* tab;
4. In the *Components* tab, select the **Show day break markers** check box and select the line that you prefer;
5. Click **OK**.

Axes and Scaling

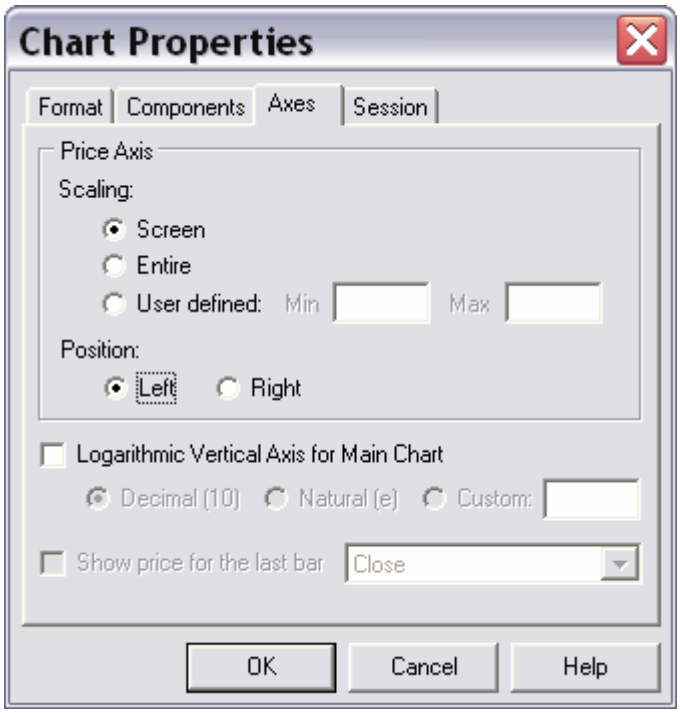
Choosing the Vertical Axis Scale Type

You can select from three different vertical axis scaling options. The *Axes* tab of the *Chart Preferences* dialog enables selecting a scaling type which suits your trading style.

To choose a price axis:

1. Double-click the chart.

The *Chart Properties* dialog box will be displayed.



2. In the *Chart Properties* dialog box, select the *Axis* tab.

3. In the **Price Axis** area of the *Axes* tab, select the check box next to the axis option that you want to use. You can select from the following options:

- **Screen**. Shows the minimum and maximum chart points of the visible chart area.
- **Entire**. The minimum and maximum of price values agreed with minimum and maximum chart points even if the chart points are out of the visible area.
- **User defined**. You can define the minimum and maximum values for the price axis using the Min and Max boxes

Note: *You can define the minimum and maximum values of the price axis using the* ***Min*** *and* ***Max*** *boxes. The default option used by Tradecision is* ***Screen.***

4. Select a position for the Vertical Axis by selecting the **Left** or the **Right** option.

Note: *If the* ***Right*** *option is selected, you can select* ***Show price for the last bar*** *check box to choose* ***Close****,* ***Open****,* ***High*** *or* ***Low****.*

5. Click **OK**.

Using the Logarithmic Scale

The Logarithmic scale is a scale on which the actual distances from the origin are proportional to the logarithms of the corresponding scale numbers. Using the Logarithmic scale, you can display prices with a wide variation range (several degrees) on a price chart. The Logarithmic Vertical Axis can be used only for the main chart. The Logarithm base can be 10, 'e' or another user-defined value.

Note: *Any value defined by the user must fall within the range of 2..100.*

To use the Logarithmic Vertical Axis:

1. Double-click the chart.

The *Chart Properties* dialog box will be displayed.

2. In the *Chart Properties* dialog box, select the *Axes* tab.

3. In the *Axes* tab, select the **Logarithmic Vertical Axis for Main Chart** check box.

4. In the lower section of the *Chart Properties* dialog box, select one of the following Logarithmic Vertical Axis value:

Decimal. Select the corresponding option (default).
Natural (e). Select the corresponding option.
Custom. Select the corresponding option and enter the required value.

Note: *Tradecision does not use* ***Logarithmic scale*** *by default.*

5. Click **OK**.

Defining a Session Range

As well as defining the day session range for the whole of a workspace, you can define the session range for a single chart.

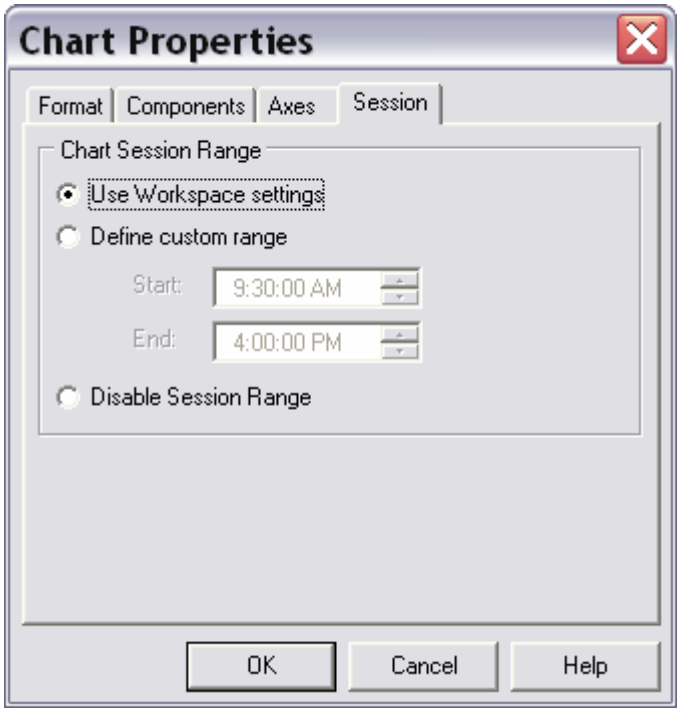
To define the session range for a chart:

1. Open a chart.

2. Right-click the chart.

3. From the shortcut menu, select **Chart Properties**.

The *Chart Properties* dialog box is displayed.



4. In the *Chart Properties* dialog box, select the *Session* tab.

5. In the **Chart Session Range** area of the *Session* tab, select the **Use Workspace settings** check box.

6. If you want to define a custom range, select **Define custom range** option, and then select the appropriate values from the **Start** and **End** lists,

–OR–

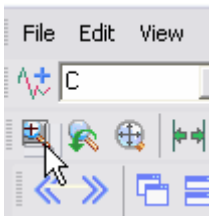
If you do not want to define a custom range, select the **Disable Session Range** check box.

7. Click **OK**.

Zooming in on or out of Parts of a Chart

You can zoom in on different parts of a chart.

Note: *To speed up the zooming procedure, you can use the corresponding toolbar buttons from the* ***Standard*** *toolbar.*



To enlarge a section of a chart:

1. From the **View** menu, select **Zoom In Box**.
2. Point to the chart and then drag to the desired location.

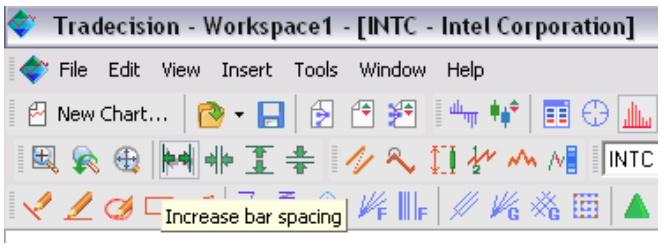
To zoom out of a chart section:

1. From the **View** menu, select **Reset zoom.**

Changing Bar Spacing and Height

The Changing bar spacing capability is used to view enlarged and more detailed versions of bar/chart sections.

Note: *To speed up the bar spacing changing procedure, you can use the corresponding toolbar buttons from the* ***Bars*** *toolbar.*


Tradecision - Workspace1 - [INTC - Intel Corporation]
File Edit View Insert Tools Window Help
New Chart...
INTC
Increase bar spacing

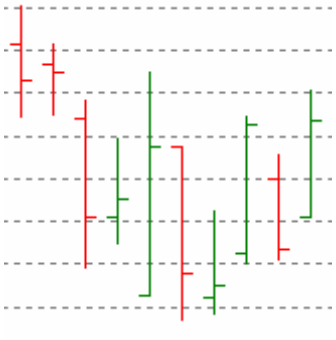
Increasing Bar Spacing

To increase the bar spacing:

1. From the **View** menu, point to **Bars**, and then select **Increase bar spacing**.

2. Click as many times as is necessary for getting the desired **bar spacing**.

3. To return to the original bar spacing, from the **View** menu, select **Reset Zoom**.



Decreasing the Bar Spacing

To decrease the bar spacing:

1. From the **View** menu, point to **Bars**, and then select **Decrease bar spacing**.
2. Click as many times as is necessary for getting the desired **bar spacing**.
3. To return to the original bar spacing, from the **View** menu, select **Reset Zoom**.

Increasing the Bar Height

To increase the bar height:

1. From the **View** menu, point to **Bars**, and then select **Increase bar height**.
2. Click as many times as is necessary for getting the desired **bar spacing**.
3. To return to the original bar spacing, from the **View** menu, select **Reset Zoom**.

Decreasing the bar height:

To decrease the bar height:

1. From the **View** menu, point to **Bars**, and then select **Decrease bar height**.
2. Click as many times as is necessary for getting the desired **bar spacing**.
3. To return to the original bar spacing, from the **View** menu, select **Reset Zoom**.

Custom Bars

Understanding Custom Bars

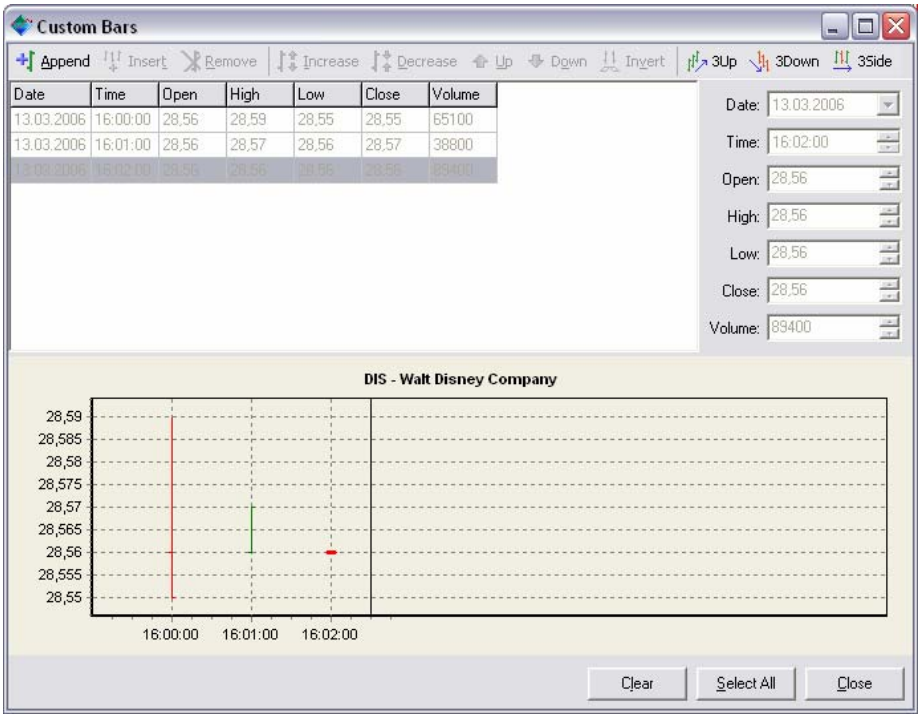
The Custom Bars capability enables the trader to prepare for different, unexpected market scenarios by visualizing and analyzing in detail the various possible market developments.

Using the Custom Bars functionality you can modify the price data in the current price chart. For example, you can add manually new bars using the **Date**, **Time**, **Open**, **High**, **Low**, **Close**, **Open Interest** and **Volume** options. Custom Bars can also be useful if you need to add new bars to test a trading strategy while modeling future market behaviors.

To add custom bars into an open chart:

1. From the **Tools** menu, select **Custom Bars**.

The *Custom Bars* window will be displayed.



The following options can be used from the Custom Bars toolbar:

a. **Append** – for adding a new row to the end of the list;
b. **Remove** – for deleting a row from the list;
c. **Insert** – for inserting a new row after a selected row;
d. **Increase –** for increasing the selected custom bars;
e. **Decrease** – for decreasing of the selected custom bars;
f. **Up** – for moving up the selected custom bar;
g. **Down** – for moving down the selected custom bar;
h. **Invert** – for switching around the open and close data of the selected custom bar;
i. **3Up** – for adding 3 bullish custom bars in a row;

j. **3Down** – for adding 3 bearish custom bars in a row;
k. **3Side** – for adding 3 sideway custom bars in a row.

2. To add a new row at the end of the list, click **Append**.

***Note**: You can add the **Date**, **Time**, **Open**, **High, Low, Close**, **Open Interest** and **Volume** values manually, or you can use the corresponding boxes in the right part of the Custom Bars dialog box.*

***Note**: At the bottom of the Custom Bars dialog box, you can see a duplicate of the opened chart to see how the bars will be added to the actual chart.*

3. Use the options from the Custom Bars toolbar, if required.

4. Click **Close**.

The Custom bars will be added to the current chart.

***Note**: In the streaming mode, the custom bars start being updated with the actual market information. Those custom bars whose date coincides with the date of the bars reflecting the actual market information are replaced by the latter.*

Chapter 5

Drawing Objects

The Tradecision functionality enables marking your price charts using a set of accurate drawing tools. You can click and drag your mouse to draw, modify and customize the trendlines, figures, Pitchforks**,** Gann tools, Fibonacci tools and many other technical analysis objects in your chart in an easy and simple manner.

Trendlines

Understanding trendlines

A trendline is a straight line that connects two or more price points and then extends into the future to act as a line of support or resistance. The breaking of a trendline usually signals a trend reversal. Trendlines illustrate the course of the market movement and give a basic consideration in any analysis.

Up Trendline

An up trendline has a positive incline and is formed by connecting two of lower points. The second low must be higher than the first for the line to have a positive incline. Up trendlines act as support and indicate that net-demand (demand less supply) is increasing even as the price increases.

A rising price combined with growing demand is very bullish and shows a strong buyer determination. As long as prices remain above the trendline, the uptrend is considered solid and intact. A break below the up trendline indicates that net-demand has weakened and a change in trend could be imminent.

Down Trendline

A down trendline has a negative incline and is formed by connecting two or more high points. The second high must be lower than the first for the line to have a negative slope. Down trendlines act as resistance and indicate that net-supply (supply less demand) is increasing even as the price declines.

A declining price combined with increasing supply is very bearish and shows a strong resolve of the sellers. As long as prices remain below the down trendline, the downtrend is considered solid and intact. A break above the down trendline indicates that net-supply is decreasing and a change of trend could be imminent.

Validation

It takes two or more points to draw a trendline. The more points are used to draw a trendline, the more validity is attached to the support or resistance level represented by the trendline. It can sometimes be difficult to find more than 2 points to build a trendline. Even though trendlines constitute an important aspect of technical analysis, it is not always possible to draw trendlines on any price chart. Sometimes, the lows or highs cannot be matched. The general rule in technical analysis is that it takes two points to draw a trendline and the third point confirms the validity.

Support and Resistance

An important concept in the use of trendlines is that of support and resistance. A continued trend is based on underlying support for prices in the market, for whatever reason. Similarly, there's resistance to higher prices built into the market. The trendline is one way to capture and illustrate these areas of support and resistance.

As long as the market stays within these areas of support and resistance, as shown by a trendline, the trend is sustained. Any penetration through a trendline warns of a possible change in trend. We may not know the reason behind such a change, but we do know that for some reason the support or resistance for a market is changing.

Signals

It is accepted by some technical analysts that signals are generated primarily when trendlines are broken. A particularly strong signal is generated any time a long term trendline is broken.

Some traders also use the price "bouncing" off a trendline as a signal. If an upward trendline holds, for instance, you may have a buying opportunity at a relatively low price. If the price is in a well-established channel, the other side of the channel can give you an approximate price target.

To draw a trendline:

1. From the the **Insert** menu, select **Trend line**.

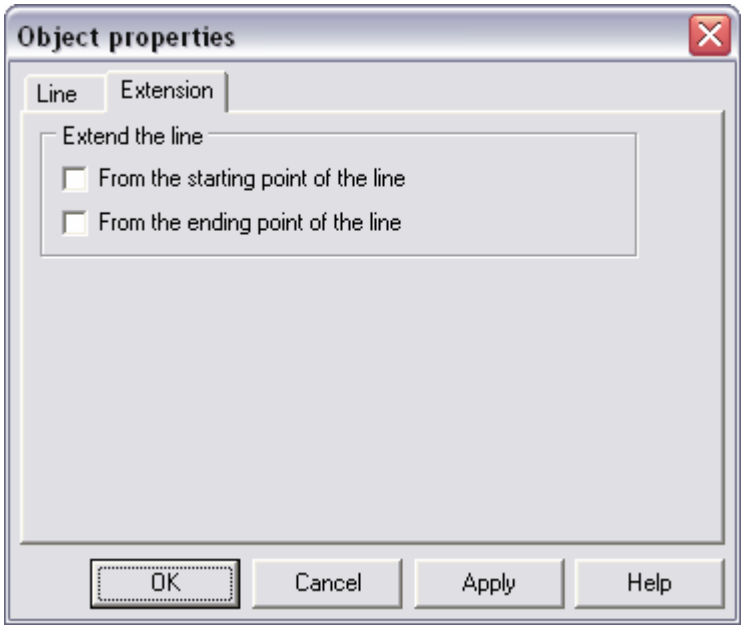
2. Position the mouse at the starting point and then drag the line to the ending point.

Extending a Trendline

To draw a trendline extension:

1. Double-click a trendline.

The *Object properties* dialog box is displayed.



2. In the *Object Properties* dialog box, select the *Extension* tab.

3. In the *Extension* tab of the *Object Properties* dialog box, select the way in which you want to extend the trendline. The following options are available:

- **From the starting point of the line**. The extension will be added to the starting point.
- **From the ending point of the line**. The extension will be added to the ending point.

4. Click **OK**.

Horizontal Line

You can use a horizontal line to draw horizontal support/resistance lines and to mark a price level across a chart.

Drawing a Horizontal Line

To draw a horizontal line:

1. From the **Insert** menu, select **Horizontal line**.

2. Position the mouse at the starting point and then drag the line to the ending point.

Extending a Horizontal Line

To extend a horizontal line:

1. Double-click a horizontal line.

The *Object Properties* dialog box is displayed.

2. In the *Object Properties* dialog box, select the *Extension* tab.

3. In the *Extension* tab of the *Object Properties* dialog box, select the way in which you want to extend the horizontal line.

- **From the starting point of the line** The extension will be added to the starting point.
- **From the ending point of the line**. The extension will be added to the ending point.

4. Click **OK**.

Vertical Line

A vertical line is a useful chart analysis tool. When depicted, it spreads across the entire workspace, including the main chart and sub-charts.

Drawing a Vertical Line

To draw a vertical line:

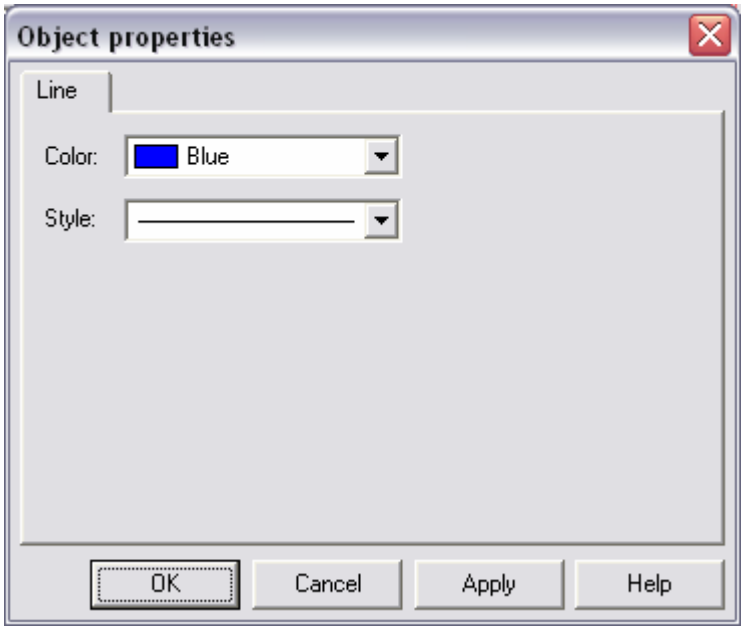
1. From the **Insert** menu, select **Vertical Line**.

2. Position the mouse at the point in your chart from which you want the line to be drawn.

To change the color and style of a vertical line:

1. Double-click a vertical line.

2. In the *Object properties* dialog box, under **Line**, select the color and style that you want to use.



3. Click **OK**.

Rectangle

A Rectangle is a drawing tool used for marking specific parts of a chart. For example, Rectangles can mark a group of bars showing an upward- or downward-trending market. Rectangles can also be used along with analytical tools.

By combining drawing tools with analytical studies, you can measure how well you are able to visually identify the market situation before applying technical analysis studies in your chart.

Drawing a Rectangle

To draw a rectangle:

1. From the **Insert** menu, select **Rectangle**.

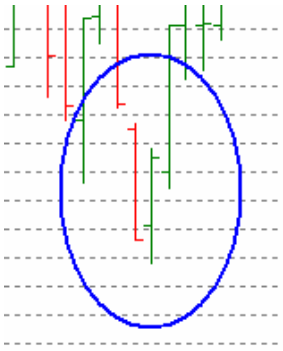
2. Position the mouse where you want to anchor and then drag it until you reach the desired dimensions.

   ***Note**: You can change the parameters of a plotted rectangle by right-clicking it and selecting **Properties** from the shortcut menu.*

Ellipse

Understanding Ellipses

Ellipse is a drawing tool used to mark specific parts of a chart that you believe important.



Drawing an Ellipse

To draw an ellipse:

1. From the **Insert** menu, select **Ellipse**.

2. Position the mouse where you want to anchor and then drag it until you reach the desired dimensions..

Triangle

Understanding Triangle

Triangle is a drawing tool used to mark specific parts of a chart. You can also use Triangles along with analytical tools.

By combining drawing tools with analytical studies, you can measure how well you are able to visually identify the market situation before applying technical analysis studies in your chart.

Drawing a Triangle

To draw a triangle:

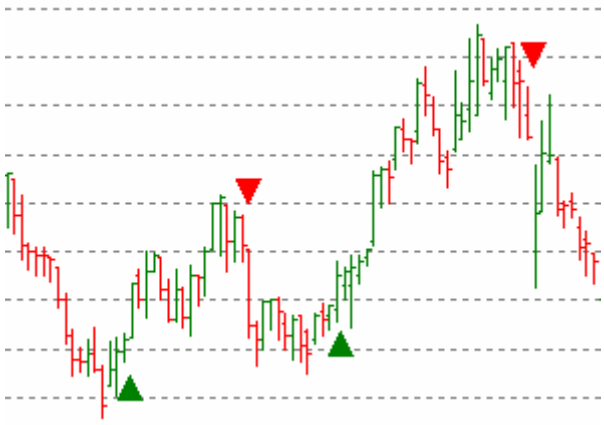
1. From the **Insert** menu, select **Triangle**.

2. Position the mouse where you want to anchor and then select the second and third points. The sides of the triangle will converge automatically.

Note: *You can change the parameters of a plotted triangle by right-clicking it and selecting* ***Properties*** *from the shortcut menu.*

Buy and Sell Markers

Buy and Sell markers are drawing tools used to mark specific parts of a chart you believe important. Using the markers, you can denote specific occurrences, such as the bar at which you purchased a stock, sold a stock, identified an uptrend, and so on.



You can use markers in conjunction with analytical tools. For example, there is always a period of time between a trading strategy generating an order and it filling the generated order. This difference in price is known as slippage. To determine an average slippage amount, you can insert a marker indicating the bar that your position was filled and then calculate the difference between the point in time when your orders are generated in accordance with your strategy and the point when these orders are filled

To insert Buy or Sell marker into a chart:

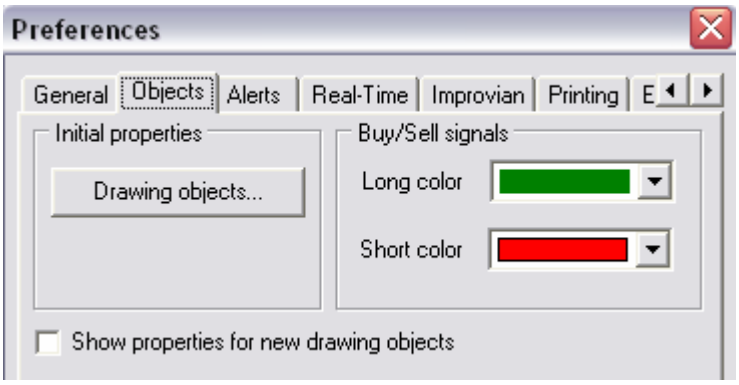
1. From the **Insert** menu, click **Buy marker** or **Sell marker**.

2. Position the mouse pointer where you want the marker to be located on the chart.
3. Click the mouse to insert the marker into the chart.

To change the color of a Buy/Sell marker:

1. From the **Tools** menu, select **Preferences**.

The *Preferences* dialog box is displayed.



2. From the **Long color** and **Short color** lists in the *Objects* tab of the *Preferences* dialog box, select the colors that you want to use**.**

3. Click **OK.**

***Note**: The colors that you have selected will be set as the default ones for all newly created markers.*

Text Label

The great flexibility of the text drawing tool enables you to enter your trading ideas, customized notations and specific chart activities directly into your chart. This allows you to save placing text notes over a chartmuch faster.

To include notes in a chart:

1. From the **Insert** menu, select **Text Label**.

2. Click the place on the chart where you want to insert the text note.

The *Text Label* dialog box will be displayed.

3. In the *Text Label* dialog box, enter the text you want to be placed on a chart.

4. Click **OK**.

Chart Markers

You can insert chart markers into a price chart to mark specific points you believe important for your analysis. The makers can be customized with color and size.

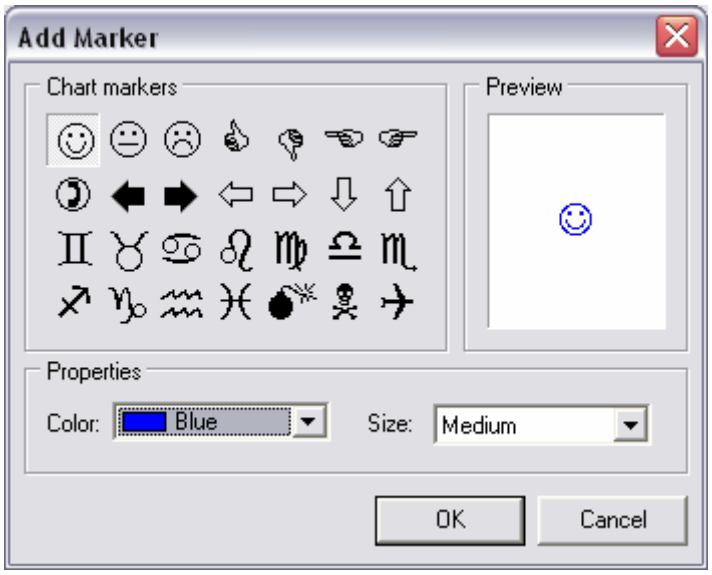
Inserting a Marker into a Chart

To stamp a marker on a chart:

1. From the **Insert** menu, select **Chart Marker**.

2. Position the mouse pointer where you want the marker to appear on the chart and click the mouse.

3. In the *Add Marker* dialog box, select a marker from the palette.



4. In the **Properties** area, select **Color** and **Size** (for example, small, medium, or large) for the selected marker.

5. Click **OK**.

Fibonacci Numbers

Understanding Fibonacci Numbers

It is believed that in the 12th century Italian mathematician Leonardo Fibonacci discovered a connection between what is now referred to as Fibonacci Numbers while studying the Great Pyramid of Gizeh in Egypt.

Fibonacci Numbers are a sequence of numbers in which each subsequent number is the sum of the two previous numbers, for example, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, and so on.

The ratio between any number and the next larger number is equal to 0.618 after the first four calculations. The ratio between any number and the next lower number is approximately 1.618 (the inverse of 0.618).

The well-known Elliott Wave Principle is also based on the application of Fibonacci numbers to the waves seen in a price chart

Managing Fibonacci Levels

Tradecision enables adding and removing Fibonacci levels.

To add or remove Fibonacci Levels:

1. Double-click the **Fibonacci Retracements**, **Extension** and **Circles** line.

The *Object Properties* dialog box is displayed.

2. In the *Object Properties* dialog box, select the *Fibonacci Levels* tab.
3. Click the **Add** button to add a new level.
4. To delete a level, select it from the list and click the **Remove** button.
5. Click **OK**.

Fibonacci Retracements

Fibonacci Retracements help anticipate support and resistance levels along with price targets. Fibonacci Retracements indicate possible support and resistance levels from important highs and lows. The distance between the start and end points is divided into Fibonacci Retracements, which suggest possible support and resistance points.

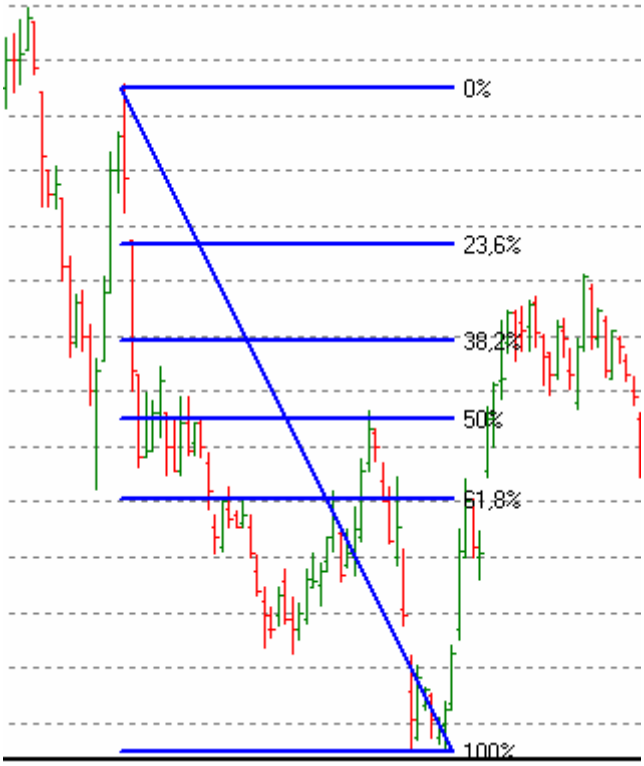
The Fibonacci Retracement tool is used to measure the amount the market has retraced compared to the overall market movement. When use together with Elliott waves, Fibonacci Retracements are commonly drawn from the beginning of Wave 1 (the Zero point) to the top of Wave 3 to find the target price area for the Wave 4 retracement.

Watch for the completion of a trend or correction at the Fibonacci Levels. Horizontal lines are drawn at the common Fibonacci levels of 38.2%, 50% and 61.8%. As the price retraces, support and resistance often occur at or near the Fibonacci Retracement levels.

Drawing Fibonacci Retracements

Fibonacci Retracements are based on a trendline drawn between a significant trough and peak. If the trendline is rising, the retracement lines will project downward. If the trendline is falling, the retracement lines will project upward.

A start and end point are neeeded to draw a Fibonacci Retracement on a chart. All the level can be changed as appropriate.



To draw Fibonacci Retracement in a chart:

1. From the **Insert** menu, select **Fibonacci Retracement**.

2. Move the cursor on the chart to the starting point.

Note: *The starting point is generally an important high or low on the chart.*

3. Then drag the mouse to the ending point.

Notes:

- *The ending point is usually the end of an important trend or correction following the starting point.*
- *The number of Fibonacci Retracement levels appearing on the chart can be changed in the object properties.*

To change the Fibonacci Retracement levels:

1. Double-click the Fibonacci Retracement.

The *Object properties* dialog box is displayed.

2. In the *Object properties* dialog box, select the *Fibonacci Level* tab.

3. Select the check boxes next to the required numbers.

4. Click **OK**.

Fibonacci Extension

The Fibonacci Extension tool is used to measure the amount the market has extended compared to the overall market movement. Fibonacci Extensions give you general target price areas.

To draw a Fibonacci Extension on a chart:

1. From the **Insert** menu, select **Fibonacci Extension**.

2. Move the cursor on the chart to the starting point.

Note: *The starting point is generally an important high or low on the chart.*

4. Then drag the mouse to the ending point.

   Note: *The ending point is usually the end of an important trend or correction following the starting point.*

To change the Fibonacci Extension levels:

1. Double-click the Fibonacci Extension.

The *Object properties* dialog box is displayed.

2. In the *Object properties* dialog box, select the *Fibonacci Level* tab.
3. Select the check boxes next to the required numbers.

4. Click **OK**.

Fibonacci Circles

The Fibonacci Circles tool is used to find support and resistance areas in both price and time. The circles are drawn centered on the last peak or trough, crossing the original trendline at the points where the retracement linesconverge. The price will tend to "react" to both the circles and the retracement levels, as they provide support and resistance.

Fibonacci Circles are plotted by first drawing a trendline between two extreme points, for instance, a trough and the opposing peak. Three circles are then drawn, centered on the second extreme point and traversing the trendline at the Fibonacci levels of 38.2%, 50.0%, and 61.8%.

Fibonacci Circles are believed to signal support and resistance if prices approach them. A common technique is to display both Fibonacci Circles and Fibonacci Fan to anticipate support and resistance at the points where the Fibonacci studies cross.

***Note**: The points where the circles cross the price data will not change depending on the scaling of the chart.*

Drawing Fibonacci Circles

Fibonacci Circles ratios are usually drawn using a recent pivot as the center of the circle and then stretching it to the latest pivot point.

Fibonacci Circles are based on a trendline that you draw between a significant trough and peak.

To draw Fibonacci Circles on a chart:

1. From the **Insert** menu, select **Fibonacci Circles**.
2. Move the cursor on the chart to the starting point. Then drag the mouse to the endingpoint.

To change the levels of Fibonacci Circles:

1. Double-click on the Fibonacci Circles.
2. In the *Object properties* dialog box, click the **Fibonacci Level** tab.
3. Select the necessary numbers check boxes.
4. Click **OK**.

Fibonacci Fans

Understanding Fibonacci Fans

The Fibonacci Fan is a three-line guide originated from the Fibonacci number series that some traders believe assist in identifying the following areas of support and resistance. The zones indicated by the fan may forecast areas of retraction in market trends.

Fibonacci Fan is displayed by drawing a trendline between two references or extreme points on the chart, generally a trough and opposing peak. Then, an invisible vertical line is drawn through the second extreme point. Three trendlines are then drawn from the first extreme point and so they pass through the invisible vertical line at the Fibonacci levels of 38.2%, 50.0%, and 61.8%.

Drawing Fibonacci Fans

Fibonacci fans are drawn by extending a trend line between two significant extremes on the chart, forexample, from a trough to the opposing peak or vice versa.

To draw Fibonacci Fan lines on a chart:

1. From the **Insert** menu, select **Fibonacci Fans** or click the **Fibonacci Fans** button on the toolbar.

2. Click and hold on the important low or high where the **Fibonacci Fans** should start.

3. Drag the line to the important high or low.

Fibonacci Time

Understanding Fibonacci Time

Fibonacci Times Zones give you a general change in trend areas in relation to time.

Fibonacci Time Zones are a series of vertical lines that are spaced at the Fibonacci intervals of 1, 2, 3, 5, 8, 13, 21, 34, etc. The first line is placed at an extreme point on the chart and the lines that follow are spaced at increasingly broader intervals in accordance with the Fibonacci sequence.

Time Zones are most appropriate to a long-dated analysis of price variation and are very likely of limited value when studying short-dated charts.

Users unpracticed with Fibonacci Studies should apply this type of analysis only when viewing charts that include multiple years.

The explanation of Fibonacci Time Zones involves looking for significant changes in price near the vertical lines.

Drawing Fibonacci Time

To draw Fibonacci Time on a chart:

1. From the **Insert** menu, select **Fibonacci Time** or click the **Fibonacci Time** button on the toolbar.

2. Click at the point in time on the price chart where you want the Time lines to begin.

. The Fibonacci Time lines (shown as vertical lines) will be automatically drawn. The following lines are drawn in sequence from left to right to define the Fibonacci Time. You can move the Fibonacci Time lines in any direction across the chart.

Fibonacci Time Retracements

Fibonacci Time Retracements can be used to predict when a change in a trend may occur. Using the tool, you can take two historical points, for example, two major highs, and project how the distance between these two points will change. The change will be expressed as percentage (say 161.8%).

The Fibonacci drawing tools enable adding levels and displaying dates (time).

To draw Fibonacci Time Retracements:

1. From the **Insert** menu, select **Fibonacci Time Retracements**.
2. Click and hold on the important low or high where the **Fibonacci Time Retracements** should start.
3. Drag the line to the important high or low.
4. Double-click the **Fibonacci Time Retracements.**
5. In the *Object Properties* dialog box, select the *Fibonacci Levels* tab.
6. If you need to add a new level, click the **Add** button,

   -OR-

   Skip to step 7 of this procedure.
7. Click **OK**. A new level will be added to the Fibonacci Time Retracements.

Andrews' Pitchforks

Understanding Andrews' Pitchforks

Andrews' Pitchfork is a line study composed of three parallel trendlines based on three points you choose.

Dr. Alan Andrews (an investment analyst and educator with an engineering degree from MIT) developed this method of drawing a Pitchfork based upon a Median Line. Dr. Andrews' rules say that the market will do one of the two things as it approaches the Median Line:

The market will reverse at the Median Line.
The market will trade through the Median Line and head for the Upper Parallel Line and then reverse.

You can use Andrews' Pitchfork to predict market turning points, and it can be used as a channeling tool for support and resistance modeling.

Dr. Alan Andrews says in his course that there is a high probability that:

1. Prices will reach the latest ML;
2. Prices will either reverse on meeting the ML or gap through it;
3. When prices pass through the ML they will pull back to it;
4. When prices reverse before reaching the ML, leaving a 'space', they will move more in the opposite direction than when prices were rising toward the ML.
5. Prices reverse at any ML or extension of a prior ML.

(Andrews, A. H., Action-Reaction Course.)

To draw Andrews' Pitchfork:

1. From the **Insert** menu, select **Andrews' Pitchfork** or click the **Andrews' Pitchfork** button on the toolbar.

2. Select the left-most point (either a major peak or trough) and then click starting from the two right-most points (a major peak and a major trough).

The Pitchfork will be automatically drawn.

Gann Analytical Tools

Understanding Gann techniques

William D. Gann (1878-1955) is a trading legend. He created and developed several powerful techniques for studying market action. These include Gann Angles, Gann Fans, Gann Grids and Cardinal Squares.

W. D. Gann believed that specific geometric patterns and angles had unique factors that could be used to forecast future price action. The main aspects of Gann's techniques were geometric angles in connection with price and time. Gann identified the most significant 1 x 1 angle (equal to a 45 degree angle) and eight other important angles.

Gann said that the ideal equilibrium between time and price exists when prices rise or fall at a 45 degree angle relative to the time axis. This phenomenon is also refered to a 1 x 1 angle (i.e., prices rise one price unit for each time unit).

All of Gann's methods require that equal time and price periods be used on the charts.

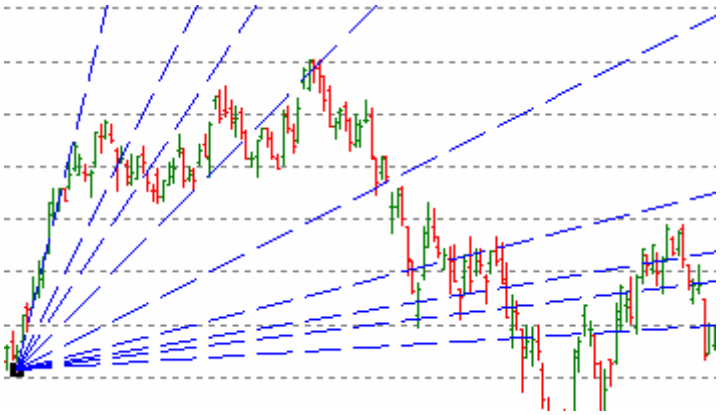
Gann Angles

These are the angles available for the Gann Angles tool. You have the ability to enable each angle separately, or all of them at once.

1x8 1 price unit for every 8 time units.
1x4 1 price unit for every 4 time units.
1x3 1 price unit for every 3 time units.
1x2 1 price unit for every 2 time units.
1x1 1 price unit for every 1 time unit.
2x1 2 price units for every 1 time unit.
3x1 3 price units for every 1 time unit.
4x1 4 price units for every 1 time unit.
8x1 8 price units for every 1 time unit.

Gann Fan

The Gann Fan is a tool that uses the squaring of time and price. This feature is capable of showing very good support and resistance levels and enabling a trader to forecast market turns.



Gann indicated nine main angles, where 1 x 1 were the most significant

1 x 8 - 82.5 degrees
1 x 4 - 75 degrees
1 x 3 - 71.25 degrees
1 x 2 - 63.75 degrees
1 x 1 - 45 degrees
2 x 1 - 26.25 degrees
3 x 1 - 18.75 degrees
4 x 1 - 15 degrees
8 x 1 - 7.5 degrees

To draw a Gann Fan on a chart:

1. From the **Insert** menu, select **Gann Fan**.
2. Click a point in time (usually, a high or a low) on a chart.

   A Gann fan will be drawn automatically.

Changing the Properties of a Gann Fan

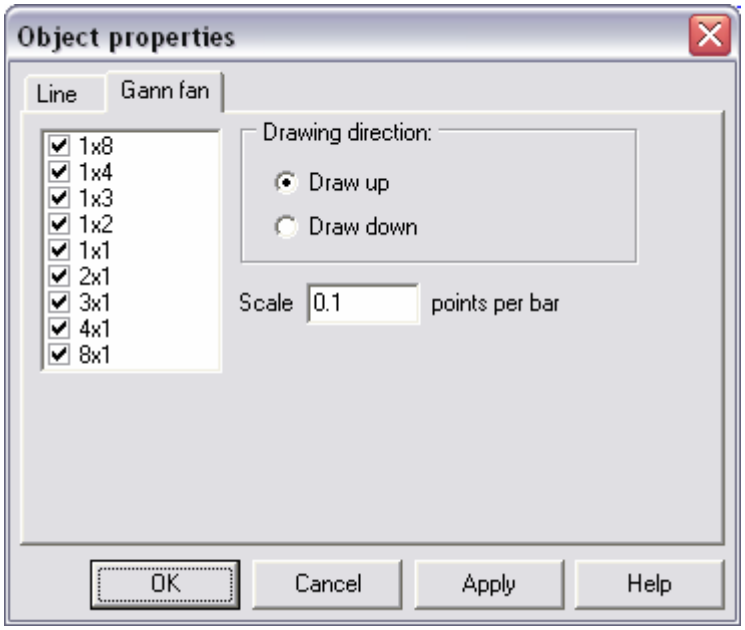
Some traders believe that Gann's 1 x 1 angle (45 degrees) should be adjusted for each stock using scaling. Some of them use 1 x 0,1 angle (where "1" is the number of the time units and "0,1" is the number of the price points).

With the help of **Scale point per bar** box, you can set and further fine-tune the value that as you believe is the most correct.

To change the properties of a Gann fan:

1. Right-click the Gann Fan on a chart.
2. From the short-cut menu, select **Properties**.

   The *Object Properties* dialog box is displayed.



3. In the *Object Properties* dialog box**,** select the *Gann Fan* tab.
4. In the *Gann Fan* tab, change any or all of the nine significant angles as appropriate by selecting the corresponding check boxes.
5. Change the Drawing direction by selecting the **Draw up** or **Drawn down** check box.
6. You can set another value in the **Scale point per bar** text box.

   Note: *Any of Steps 4-6 of this procedure is optional.*

7. Click **OK**.

Changing the Color and Style of Gann fan

Tradecision supports customizing the color and/or style of a Gann Fan.

To change the color and style of a Gann Fan:

1. Select the color and style you need on the **Color and Style** toolbar.

Note: *If you do not see the* ***Drawing object properties*** *toolbar,right-click the toolbar area and select the* ***Color and Style*** *toolbar from the shortcut menu.*

Gann Cardinal Squares

Gann square is a tool for anticipating future support or resistance levels using the all-time low or high price of an instrument. The all-time low or high price serves as the basic point.

Each higher price increase is entered in a grid managed in a clockwise manner around the basic point, starting from one place left of the origin. The resulting formation looks like a square, where the x and y axes are known as the cardinal-cross. Higher price increments that fall within the cardinal-cross are, according to Gann, the most likely future support or resistance levels.

When you insert Gann Squares into a chart, the geometric formations can indicate important support and resistance levels.

To draw Gann Cardinal Squares:

1. From the **Insert** menu, select **Gann Cardinal Squares**.
2. Click a point in your chart.

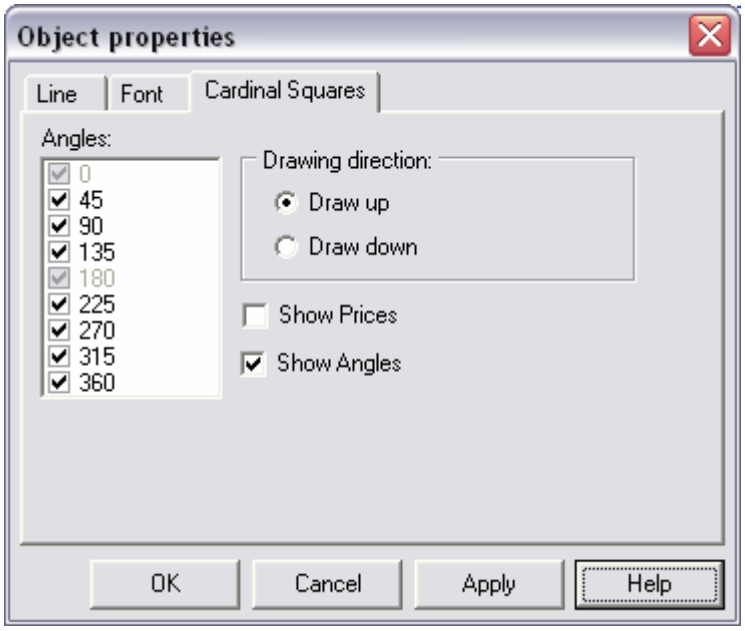
   Gann Cardinal Squares will be drawn automatically.

Changing Gann Cardinal Squares properties

To change the properties of Gann Cardinal Squares:

1. Right-click the Gann Cardinal Squares in a chart.
2. From the short-cut menu, select **Properties**.

   The *Object Properties* dialog box wil be displayed.



3. In the *Object Properties* dialog box, select the *Cardinal Squares* tab.
4. In the *Cardinal Squares* tab of the *Object Properties* dialog box**,** choose the required angles by selecting the corresponding check boxes.
5. To change the Drawing direction, select the **Draw up** or **Drawn down** check box.
6. To display the angles and/or prices, select the **Show Angels** and/or **Show prices** check boxes.

   Note: *Any of Steps 4-6 of this procedure are optional.*

7. Click **OK**.

To change the color and style of Gann Cardinal Squares:

You can change the color and/or style of Gann Cardinal Squares by selecting the required color and/or style on the **Color and Style** toolbar.

Note: *If you do not see* ***Drawing object properties*** *toolbar, right-click the toolbar area and select the* ***Color and Style*** *toolbar from the shortcut menu.*

Gann Grid

Gann Grid is used to divide the space of price and time into the most important Gann angle (1x1).

Drawing Gann Grid

1. From the **Insert** menu, select **Gann Grid**.

2. Move the cursor to the starting point in the chart . Then drag the mouse to the ending point of the Gann Grid.

Changing the Properties of a Gann Grid

To change the properties of a Gann Grid:

1. Right-click the Gann Grid in a chart.
2. From the short-cut menu, select **Properties**.

   The *Object Properties* dialog box is displayed.
3. In the *Object Properties* dialog box**,** select the *Gann Grid* tab.
4. Enter the required values in the **Time bars** and **Price points** boxes in the **Grid Cell area** of the *Gann Grid* tab.
5. Click **OK**.

Changing the color and style of a Gann Grid

To change the color and style of a Gann Grid:

You can change the color and/or style of a Gann Grid by selecting the required color and/or style on the **Color and Style** toolbar.

Note: *If you do not see* ***Drawing object properties*** *toolbar, right-click the toolbar area and select the* ***Color and Style*** *toolbar from the shortcut menu.*

Moving Objects

You can move any of the drawing objects in a chart.

To move an object:

1. Click the object that you want to move.
2. Drag the object to its new location.

Deleting Objects

To delete an object:

1. Click the object that you want to delete.
2. From the **Edit** menu, select **Delete**.

Removing Groups of Objects from a Chart

When you have multilple drawing objects in your chart, it can be too cumbersome to remove them manually. Using the **Remove charts objects** tool, you can delete all instances of one or more objects.

To remove an object from a chart:

1. To remove multiple instances of one object, from the **Edit** menu, point to **Remove From Chart**, select **Chart Objects.**
2. Select or clear the corresponding check boxes.
3. Click **OK**.

Changing the Color and Style of an Object

To change the color and style of an object:

1. Double-click the object.
2. In the *Object properties* dialog box, under **Line**, select the color and style that you want to use.
3. Click **OK**.

Sub-charts

In Tradecision, sub-charts are used to display indicators.

You can insert any drawing object into a sub-chart area. For example, you can draw trend lines to analyze the divergences between an indicator and the main price chart.

Each sub-chart has its own value axis (y-axis). All sub-charts share a common date axis (x-axis). In other words, all of the sub-charts show their data during the same date range.

The value axis (y-axis) of each sub-chart displays the range of values included in that sub-chart. By default, the range of values adjusts automatically to include all of the values in the current date range for the data fields in the sub-chart. It can also be set to a constant value range.

The date axis (x-axis) displays the range of dates currently displayed in sub-charts. The date range can be changed to any range of dates for which there is data. The values used in the date axis adjust automatically to display as much detail about the date range as possible.

The Horizontal scroll bar at the bottom of the Chart/Sub-chart can be used to quickly move the date range while keeping the same number of samples displayed.

Volume Sub-Chart

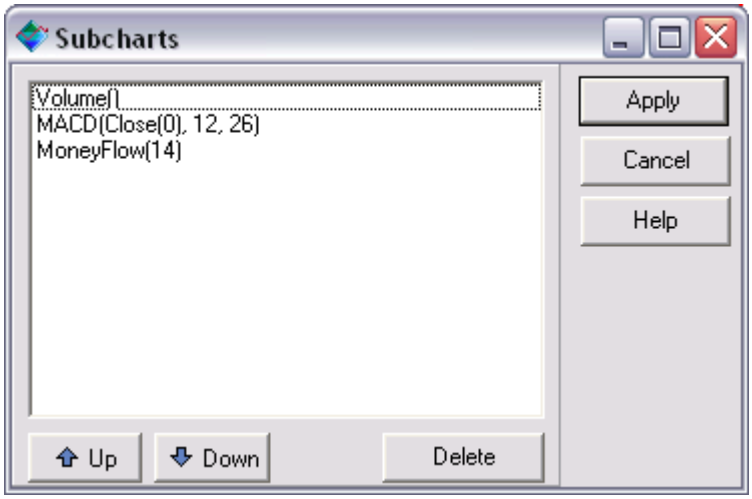
The Volume sub-chart is automatically added when you create a new chart. It can quickly be removed using a special toolbar button on the main toolbar. The Volume sub-chart can also be added using the *Insert Indicator* dialog box.

Volume is simply a number of shares (or contracts) purchased and sold during a specified time period (e.g., hour, day, week, month, year). On a chart, volume is usually represented as a histogram (vertical bars) below the price chart. The analysis of volume is a basic yet very important element of technical analysis.

Changing the Order of Sub-Charts

To change the order of the sub-charts:

1. From the **View** menu, click *Manage Subcharts*.



2. In the *Subcharts* dialog box, click the sub-chart that you want to move. You can use the **Up** or **Down** button to change the position of the selected sub-chart.

3. Click **Apply.**

Deleting Sub-Chart

To remove a sub-chart:

1. Right-click the sub-chart that you want to delete.
2. Select **Remove Subchart**.

   The sub-chart will be deleted.

Exporting Chart Data

The system allows exporting the data in a chart. The export controls are located in the chart's context menu. .

The **Export Buy/Sell Markers** option of the context menu is responsible for exporting the buy/sell marker data into a csv file. The resulting file contains two columns.
The first column contains the date and time and the second one contains the check box of the buy/sell marker's availability: 1 – the current bar has the buy marker;
-1 – the current bar has the sell marker; 0 – the current bar has neither the buy nor the sell marker.

To export buy/sell markers into a csv file:

1. Right-click the chart that you want to export from and select **Export Buy/Sell Markers.**

2. In the file-loading window, select the path for storage of the .csv file.

The **Export Subgraph Data** option is responsible for exporting the current value of the current indicator into a csv file. The resulting file contains two columns: the date /time and the value of the indicator.

To export subgraph data:

1. Right-click the chart that you want to export from and select **Export Subgraph Data.**

2. In the file-loading window, select the path for storage of the .csv file.

The **Export All Subgraph Data** option is responsible for exporting the values of all the indicators in the chart into a csv file. The resulting file contains the column date/time and columns with the values of the indicators.

To export all subgraph data:

1. Right-click the chart that you want to export from and select **Export All Subgraph Data.**

In the file-loading window, select the path for storage of the.csv file.

Chapter 6

Templates

Understanding Templates

Using templates you can quickly create charts applying specific visual settings, such as color, line style/type and technical indicators. For example, if you want to analyze your securities with an SMA, CCI, and MACD, you can save this information in a template and apply it to any new chart very quickly.

To do so, you just need to create a chart with the features you need, save your work as a template and then open another price chart and click **Apply Template**. You can also create a default template, which will be used every time a new chart is created. A default template is automatically applied to a security when a new price chart is opened.

You can have several templates, each containing some specific settings. Each template is saved as a file with a *.tpl extension.

Applying a Template

To apply a template to a chart:

1. Open a chart.
2. Right-click the chart.
3. Select **Apply Template** from the shortcut menu.

   The *Open* window will be displayed.
4. Select the desired template from the *Open* dialog box.

Saving as Template

To save the current chart settings as a template:

1. Right-click a chart and select **Save as Template**.

***Note**: When saving a template, the **Templates** directory is automatically displayed. All template files have *.tpl extension.*

***Note**: You cannot save analytical studies and drawing tools in a template.*

Saving the Current Chart Settings as a Default Template

To save current chart settings as a default template:

1. Right-click a chart and select **Save as Default Template.**

***Note**: The template will be saved into "Templates\default.tpl". The template will be automatically applied to all new charts.*

***Note:** You cannot save analytical studies and drawing tools in a template.*

Chapter 7

Workspaces

Workspaces provide a convenient way to manage charts and organize your investment ideas.

Understanding Workspaces

With Tradecision's workspaces you can organize your charts the way you like.

Workspace is a single file that contains all the charts with their drawing objects, indicators and studies. When a workspace is opened, each chart is opened and displayed on the screen exactly the way it appeared when the workspace was saved, including all the chart elements. When you save a workspace, you save all your changes and modifications in all active charts.

You can create a separate workspace for your favorite stock, a group of stocks, an industry or anything you need to work with. For example, you may want to analyze QQQ and Dow along with four of your favorite indicators. Or you may want to save the current positions of windows with all their elements. The best way to save your time and manage groups of charts/sub-charts/objects is using workspaces.

Once you have created a workspace, you can add new chart windows to the workspace, manage charts, indicators, sub-charts, analytical studies, as well as many other trading ideas, and then save them on your local hard drive.

You can work with one workspace at a time.

Tradecision saves a workspace in a file with extension Tradecision Workspace (*.tws).

Creating and Saving a Workspace

A blank workspace is automatically created when you start Tradecision.

To save a workspace:

1. From the **File** menu, select **Save workspace**.
2. In the **Save as** dialog box, select the folder where you want to save a workspace and then enter the name of the new file.
3. Click **Save**.

***Note**: We advise that you save your workspaces often when making extensive changes so that you elude losing your work due to power outages or other unplanned occurrences.*

Opening Workspaces

To open any of the previously saved workspaces:

1. From the **File** menu, click **Open workspace**.

2. In the *Open* dialog box, select the folder containing the file with the workspace that you want to open.

3. Open the file with the workspace.

4. Click **Open**.

***Note**: If a workspace meets the following criteria, the signals of the strategies may differ from those of the previous session:*

1. The workspace contains strategy signals, Analytical Studies;
2. Data update of the symbol, contained in the workspace, was made using Data Manager or in the streaming mode;
*3. The **Load only…bars** option is selected in the **Number of bars to be loaded** area of the **Preferences> General** tab.*

*To avoid any possible differences, you will be offered to increase the number of the bars being loaded. The value in the **Number of bars to be loaded** area will then be set to **Automatically**.*
*In case of reject, the number of the bars, set in the **Load only** list, will be loaded into the chart.*
In this case, it cannot be guaranteed that the signals of the strategies will be the same.

Closing a Workspace

To close a workspace:

1. From the **File** menu, select **Close workspace**.

   If you have made any changes to the workspace since it was last saved, the *Save A*s dialog box prompts you to save or discard the changes.

2. Click **Yes** to save the current workspace before closing it,

–OR–

Click **No** to discard any changes that may have been made.

Deleting Workspace

If you decide to remove a workspace from your local hard drive, you need to manually delete the appropriate file with**.tws** extension using the Windows Explorer or some other file manager.

Chapter 8

Technical Indicators

High expertise level in using technical indicators is the absolute "must have" for a long-term success in trading.

About Technical Indicators

Tradecision enables using the 100+ most popular technical indicators.

An indicator is a mathematical calculation that can be applied to a stock's price, volume or even to another indicator. The result is a value that is used to anticipate future changes in prices.

Indicators can inform you about the various aspects of the market, such as trend, volatility, momentum, market strength, cycle, and so on.

There are many different classes of indicators:

Trend indicators are used to provide information on price trends. Trends measure the persistence of a price to move in a certain direction during a certain period of time. Trend indicators are moving averages, MACD, DMI, Linear Regression, and so on.

Volatility indicators, such as Bollinger Bands, Average True Range, Standard Deviation, should be used if you want to inform a model about price volatility. Volatility measures the magnitude of day-to-day fluctuations in prices (irrespective of the direction in which they move).

Price momentum indicators such as RSI, Stochastic, PercentR and CCI measure the speed at which prices move during a certain time period. Very often this kind of indicators is very useful.

There are also market strength indicators, such as OBV, Chaikin Oscillator, Ease of Movement, MFI, and different volume indicators.

Adding an Indicator

To add an indicator to a chart:

1. From the **Insert** menu, select **Indicator**.

The *Insert Indicator* dialog box will be displayed.

A description of the selected indicator will appear in the **Description** box.

2. In the *Indicator List* tab of the **Insert Indicator** dialog box, under **Indicators**, enter or select the indicator that you want to insert into a chart or sub-chart.

3. In the **Indicator Parameters** area change the parameter value of the selected indicator.

4. Select the *Style* tab and choose the color and style of the indicator.

5. In the *Style* tab, indicate where the indicator should be plotted by selecting the corresponding check-box. The following options are available:

- A new sub-chart.
- The main chart.
- An existing sub-chart**.**

6. Click **Insert**.

The selected indicator will be added to the selected location.

Customizing Indicator

1. Right-click the indicator and select **Properties**.

The *Edit Indicator* dialog box will be displayed.

2. If required, in the *Properties* tab of the *Edit Indicator* dialog box, under **Indicator Properties**, change the **Parameter** and **Value** of the selected indicator.

3. Click **OK.**

You can customize the color and style of the lines that make up the selected indicator.

To customize the color and style of indicator lines:

1. Right-click the indicator and select **Properties**.

The *Edit Indicator* dialog box will be displayed.

2. In the *Edit Indicator* dialog box, select the *Style* tab.

3. In the **Indicator Style** area of the *Style* tab, select the color and style of the indicator lines.

Note: You can also select the Display Style.

4. Click **OK**.

Indicator Thresholds

There are indicators that require specific values for their interpretation. For example, the Relative Strength Index is generally considered to be at an overbought level above 70 and an oversold one below 30.

Tradecision uses thresholds to mark these important levels. The Thresholds are horizontal lines usually placed at different levels of a chart to help in the interpretation of a certain indicator. Every time the indicator is plotted, the specified thresholds will be drawn automatically.

For each indicator, you can enter up to 10 threshold values and select a different color and style for each of them.

To define or change the indicator thresholds:

1. Right-click the indicator and select **Properties**.

   The *Edit Indicator* dialog box will be displayed.

2. In the *Edit Indicator* dialog box, select the **Style** tab.

3. In the **Thresholds** area of the **Style** tab, enter a threshold value in the **Value** box.

4. Click **Add** or **Remove** to add or remove new value parameters.

5. Select the **Color** and **Style** you want to be used to display the threshold.

6. Click **Add**. The newly created threshold value will be added to the thresholds list.

   ***Note**: The threshold can be deleted by selecting it and clicking **Delete**.*

7. Click **OK**.

Deleting Indicator

To remove an indicator along with a sub-chart:

1. Right-click the indicator.
2. Select **Remove Subchart**.

   The sub-chart and its indicators will be deleted.

To remove an indicator from the main chart:

1. Right-click the indicator line.
3. Select **Remove Object**.

   The selected indicator will be deleted from the main chart.

Indicator Descriptions

An indicator is a mathematical calculation that can be applied to a stock's price, volume or even to another indicator. The result is a value that is used to anticipate future changes in prices.

The following technical indicators are available through the *Insert Indicator* dialog box:

Acceleration Indicator
Acceleration is the slope of the line fitted between the current price series slope and the price series slope of a specified number of bars ago.

Accumulation/Distribution
Accumulation/Distribution uses the closing price's proximity to the high or low to determine if accumulation or distribution have occured in the market. The proximity value is multiplied by volume to give more weight to moves with higher volume.
A divergence between the price and Accumulation Distribution may indicate a trend reversal.

Adaptive Moving Average
Adaptive Moving Average differs from other moving averages in that it uses changes in volatility to transform the lengths used to calculate two moving averages. The two moving averages are referred to as the fast average (shorter length) and the slow average (longer length). The adaptive moving average that was discussed in the interview with Perry Kaufman in the 1998 STOCKS & COMMODITIES Bonus Issue (the article originally appeared in March, 1995) is an excellent alternative to the standard moving average calculations.

ADX – Directional Movement Indicator
ADX attempts to measure the strength of a trend. A low ADX value (generally, less than 20-30) can indicate a non-trending market with low volatility whereas a cross above 20-30 may signal the start of a trend (either upward or downward).
This indicator can also be used to identify non-trending markets, or a deterioration of an ongoing trend.

ADX Classic (rounded)
ADX Classic is calculated in much the same way as ADX, except that the ADX indicator includes decimal values in its results while the ADX Classic Indicator returns only the integer portion of the ADX value. This rounding process will cause differences in the value of ADX and ADX Classic over time. The ADX Classic calculation resembles more closely Welles Wilder's original interpretation of ADX.

ADXR (signal line)
The ADXR component is simply a special type of moving average (WilderMA) applied to the ADX indicator. ADXR is sometimes used as a signal line. A buy signal occurs when ADX crosses above ADXR, and a sell occurs when ADX crosses below ADXR. The ADXR differs from

ADX in that the ADXR is less sensitive to short, quick reversals because the ADXR results in a "smoother" calculation.

AKF
Adaptive Kalman Filter returns filtered (smoothed) data, transferred in the Price parameter. The Length parameter, defining the filtering period, is similar to the Length parameter in the moving averages, for example, in EMA. The sharpness influences the smoothness and its value is set as a value within the range from 1 to 10. The greater this parameter is, the higher will be the smoothness of the resulting data. The recommended value is 2,3.

Auto Trend Inter Indicator
This indicator shows that one of the current current bars belongs to the bullish, beararish or side-way trend. The indicator is calculated using the same algorithms as those used for calculating the Auto-Trends study. For a bullish trend, the value of the indicator is > 0. For a bearish trend, the indicator is < 0. For a sideway trend, the indicator is 0.

Auto Trend Major Indicator
This indicator shows that one of the current bars belongs to the bullish, beararish or side-way trend. The indicator is calculated using the same algorithms as those used for calculating the Auto-Trends study. For a bull trend the value of the indicator is > 0. For bear trend the indicator is < 0. For sideway trend the indicator is 0.

AutoTrend Minor Indicator
This indicator shows that one of the current bars belongs to the bullish, beararish or side-way trend. The indicator is calculated using the same algorithms as those used for calculating the Auto-Trends study. For a bull trend, the value of the indicator is > 0. For bear trend the indicator is < 0. For sideway trend the indicator is 0.

***Note**: Each of the Auto-Trend indicators has a real-tme version. The difference in calculating the real-time version of any indicator is that no future time values are used, whereas for calculating the regular offline versions future values are used along with present and past values.*

Average Price
This function returns the average price of a bar.

Average True Range
The Average True Range is the average of the True Ranges over a specified Period. True Range measures the conventional range of a bar, but checks the previous bar's closing price to determine if it is outside the current bar's range. If it is, this closing price is used instead of the high or low. This helps account for gaps between bars. An expanding ATR indicates increased volatility in the market.

Bollinger Band %B (Middle Line)
Bollinger Bands are moving average envelopes that are plotted at a standard deviation level above and below price. As the distance of the

bands is based on standard deviation, they adjust themselves to volatility swings in the underlying price.

Bollinger Bands tighten as volatility decreases, and expand sharply as it increases. Prices normally have a tendency to bounce within the bands' envelope. However, prices can exceed a band envelope for extended periods of time during strong trends.

Bollinger Band High
Upper Bollinger Band. Bollinger Bands are moving average envelopes, plotted at a standard deviation level above and below the price. As the distance of the bands is based on standard deviation, they adjust themselves to volatility swings in the underlying price.

Bollinger Bands tighten as volatility decreases, and expand sharply as it increases. Prices normally have a tendency to bounce within the band envelope. However, prices can exceed a band envelope for extended periods of time during strong trends.

Bollinger Band Low
Lower Bollinger Band. Bollinger Bands are moving average envelopes, plotted at a standard deviation level above and below the price. As the dimension of the bands is based on standard deviation, they adjust themselves to volatility swings in the underlying price.

Bollinger Bands tighten as volatility decreases, and expand sharply as it increases. Prices normally have a tendency to bounce within the band envelope. However, prices can exceed a band envelope for extended periods of time during strong trends.

Bollinger Band Width (High-Low)
Bollinger Bands are moving average envelopes, plotted at a standard deviation level above and below the price. As the dimension of the bands is based on standard deviation, they adjust to volatility swings in the underlying price.

Bollinger Bands tighten as volatility decreases, and expand sharply as it increases. Prices normally have a tendency to bounce within the band envelope. However, prices can exceed a band envelope for extended periods of timeduring strong trends.

CCI – Commodity Channel Index
Commodity Channel Index is calculated by determining the difference between the mean price of a security and the average of the means for the selected period. This difference is compared with the average difference for the period of time. The result is multiplied by a constant to ensure that most of the values fall within the standard range of +/- 100.
It is recommended that one look for divergences between the indicator and the price. Also, look for extreme readings above 100 and below -100, indicating overbought and oversold levels.

Chaikin A/D Oscillator
The Chaikin Oscillator is created by subtracting a 10-period EMA of Accumulation/Distribution from a 3-period EMA of Accumulation/Distribution. This allows analyzing accumulation and distribution in the convenient form of an oscillator.
It is recommended that one look for divergences between the oscillator value and price. Another way to use the oscillator is to look for a change of direction as a buy or sell signal.

Change
The difference between the current and previous price values.

Correlation (directional)
The Correlation indicator calculates the frequency of price movement in the same direction and in the opposite directions for two price series during for a specified number of bars. This frequency is indexed as a value between 1 and –1. It is used as a measure of the tendency of two price series to move in the same direction.

A positive Correlation value indicates that the two price series tend to move in the same direction. A negative Correlation value indicates a strong tendency for these two price series to move in the opposite directions. A Correlation value close to 0 indicates that there is very little correlation between the two price series.

***Note**: The indicator should not be confused with Pearson correlation.*

Detrended Price Oscillator
The Detrend Price Oscillator is similar to a moving average in that it filters price trends to more easily identify cycles. The indicator is an attempt to define cycles in a trend by drawing a moving average as a horizontal straight line and placing prices along the line according to their relation to a moving average. The indicator provides a means of identifying the underlying cycles that are not apparent when the moving average is viewed within a price chart. Cycles whose duration exceeds the number of bars used to calculate the Detrend Price Oscillator are effectively filtered or removed by the oscillator.

Directional Movement Index
The Directional Movement Index is used for distinguishing between a significantly trending market and a market with only a sideways movement. The DMI values range between 0 and 100. The closer to 100 the value is, the stronger the trending characteristics of the market. The closer to 0 the value is, the stronger the sideways characteristics of the market.

DMI Minus
DIMinus measures a market's negative directional movement. If DIMinus is greater than DIPlus, the prices have a stronger negative directional movement.

DMI Plus
DIPlus measures a market's positive directional movement. If DIPlus is greater than DIMinus, the prices have a stronger positive directional movement.

Ease of Movement
The Ease of Movement indicator calculates and plots a measure of relationship between the price and the volume. For instance, a market that rises on low volume shows a high Ease of Movement, generating positive values for the indicator. Negative values are generated when prices are moving down with light volume. When the indicator's value is close to0, the prices are not moving or a heavy volume is required to move them.

Ease Of Movement (smoothed)
Calculates a length moving average of the Ease of Movement value using a calculation method. Valid methods are SIMPLE, EXPONENTIAL, TRIANGULAR, and VARIABLE (can be abbreviated as S, E, W, T, TRI, and VARI.)

Elliott Waves Inter Indicator
Shows the number of a current Elliott wave. The indicator is calculated using the same algorithms as the Elliott Waves study. For upward waves 1,2,3,4, and 5 the indicator is equal to 1,2,3,4,5correspondingly. For waves A,B,C , the indicator is equal to 6,7,8. For downward waves, the indicator takes the same values, but with the minus sign.

Elliott Waves Major Indicator
Shows a number of the current Elliott wave. The indicator is calculated using the same algorithms as those used by the Elliott Waves study. For upward waves 1,2,3,4,5 the indicator is equal to1,2,3,4,5,correspondingly. For A,B,C waves, the indicator is equal to 6,7,8. For downward waves, the indicator takes the same values, but with the minus sign.

Elliott Waves Minor Indicator
Shows the number of the current Elliott wave. The indicator is calculated using the same algorithms as those used by the Elliott Waves study. For upward waves 1,2,3,4,5 the indicator is equal to 1,2,3,4,5 correspondingly. For A,B,C waves, the indicator is equal to 6,7,8. For downward waves, the indicator takes the same values, but with the minus sign.

Efficiency
Efficiency is used to calculate the Adaptive Moving Average.

EMA – Exponential Moving Average
EMA returns the Exponential Moving Average of a specified period. EMA is similar to Simple Moving Average (SMA) in that it averages the data over a period of time. However, whereas SMA just calculates a straight average of the data, EMA applies more weight to the data that is morerecent. The most weight is placed on the most recent data point. Because of the way it's calculated, EMA will follow prices more closely than its corresponding SMA.

Envelope High
Envelope High indicator is calculated by increasing a moving average by specified percentage. Moving averages are recognized for their value in identifying trends. Using moving averages of highs and lows, and adjusting them to a fixed percentage, can be helpful in finding extreme conditions of the overbought or oversold levels and in identifying the trading ranges.

Envelope High and Envelope Low are calculated using price data from the same number of bars.

Envelope Low
The Envelope Low indicator is calculated by reducing a moving average by specified percentage.
Moving averages are recognized for their value in identifying trends. Using moving averages of highs and lows, and adjusting them for a fixed percentage, can be helpful in finding extreme conditions of the overbought or oversold levels and in identifying the trading ranges.

Envelope High and Envelope Low are calculated using price data from the same number of bars.

Forecasted Price
The indicator returns the forecasted price of a neural model. The name of the model must be in the "<name>@<symbol>" format. For example, for a model with the name 'My_Model_1' trained for the symbol 'CAT', the parameter value will be "My_Model_1@CAT".

Note: *this function does not work if the model output is a custom indicator.*

IMA
Ingenious Moving Average (IMA) is a moving average that is based on the Kalman Adaptive Filter. IMA has extremely low lag and noise characteristics.

IMACD
Moving Average Convergence Divergence indicator is a momentum oscillator that is constructed by subtracting the value of a long MA from a short MA. MACD crossing above zero is considered bullish, and crossing below zero bearish. Secondly, when MACD turns up from below zero it is considered bullish. When it turns down from above zero this is considered bearish.As the MA, IngeniousMA is used

KBABot
Kirshenbaum Bands measures market volatility using standard error of linear regression lines of the close. The effect is that they gauge the volatility around the current trend.

KBATop
Kirshenbaum Bands measures market volatility using standard error of linear regression lines of the close. The effect is that they gauge the volatility around the current trend.

Linear Regression Line
The Linear Regression Line indicator calculates the Regression Line of the period that you have specified. The function returns the predicted value at the end of the period. Since the Linear Regression indicator displays the statistically predicted price value, you can look for cases where the prices vary sharply from the predicted value.

N-ATR
N-ATR (Normalized Average True Range) is a good tool for improving your trading and/or market analysis by making a historical and multiple security comparison. For detailed information, refer to "Cross-Market Evaluations with Normalized Average True Range" article by John Forman (TASC magazine, May 2006).

MACD – Moving Average Convergence Divergence
Moving Average Convergence Divergence indicator is a momentum oscillator that is constructed by subtracting the value of a 26 day Exponential Moving Average (EMA) from a 12 period EMA. The shorter EMA is constantly converging toward, and diverging away from, the longer EMA. This causes MACD to oscillate around the zero level.

There are two classic interpretations of MACD. MACD rising above zero is considered bullish, and it falling below zero is considered bearish.In the second case, when MACD returns from below zero it is considered bullish. When it returns from above zero, MACD is considered bearish.

Another common technique it to time trades according to the MACD rising above or falling below its "signal line." The signal line is typically a 9 period EMA of the MACD.

Market Facilitation Index
The MFI indicator calculates the measure of price movement's efficiency of by gauging the correlation of the range of a bar relative with its volume. A market is considered efficient when a wide price range is accompanied by low volume. Conversely, a market is considered less efficient when a narrow price range is accompanied by high volume.

Mass Index
Mass index identifies trend reversals by measuring the narrowing and widening of the range between the high and low prices. For details, refer to Stocks & Commodities, V. 10:6 (265-267): The Mass Index by Donald Dorsey.

Median Price
Calculates the Median Price indicator: (high + low) / 2

MFI – Money Flow Index
Money Flow Index measures the flow of money into and out of a security. It is similar to Relative Strength Index (RSI), but takes volume into account in its calculation. The indicator is calculated by accumulating the positive and negative Money Flow values, and then creating a Money Ratio. The Money Ratio is then normalized into the MFI oscillator form.

MFI values above 80 typically indicate overbought levels, and values below 20 – oversold ones. You can also look for divergences between the MFI and the price as signs of potential trend reversals.

Momentum Indicator
Momentum is the current price of a security, subtracted from the price it had a specified number of bars ago. A Momentum value above zero indicates that the price is are moving up, and below zero that they are moving down.

Momentum can help pinpoint the end of a decline or advance. When Momentum turns up or turns down, it is a sign that the current move may be running out of steam.

Money Flow
Money Flow is equal to the average price ((high + low + close) / 3) multiplied by volume.
Money Flow is the core component of the Money Flow Index (MFI) indicator.

OBV – On Balance Volume
On Balance Volume measures the strength of volume moving into and out of a security. If prices close up, the current bar's volume is added to OBV, and if prices close down, it is subtracted. The result is an indicator that depicts the flow of volume into and out of a security.

You can often spot divergences between price action and the OBV indicator. For example, if prices make a new high but the move is not accompanied by sufficient volume, OBV will fail to make a new high. Such divergences can be a sign that a trend is nearing completion.

Outside Bar
Marks bars whose High is lower than the High of the previous bar, and whose Low is higher than the Low of the previous bar.

Parabolic SAR
Developed by Welles Wilder, creator of RSI and DMI, the Parabolic SAR sets trailing price stops for long or short positions. Also referred to as the stop-and-reversal indicator (SAR stands for "stop and reversal"), Parabolic SAR is more popular for setting stops than for establishing a direction or trend. Wilder recommended establishing the trend first, and then trading with Parabolic SAR in the direction of the trend.

Percent Change
Returns the percent change between the current time series value and the time series value n periods ago.

Percent R
PercentR is a momentum indicator used to gauge overbought and oversold levels, and ranges between 0 and 100. However, unlike most other momentum oscillators, the low end of the scale represents an overbought area, and the high end – an oversold condition.

A reading of above 80 indicates oversold levels, and a reading below 20 indicates overbought ones. Williams %R has a tendency to peak ahead of price, so it can be a good tool for identifying trend reversals.

Price High
Price High is the highest value for a specified number of bars.

Price Low
Price Low is the lowest value for a specified number of bars.

Price Oscillator
The Price Oscillator indicator shows the difference between two moving averages of a stock's price. The difference between the moving averages can be expressed in either points or percentages

Price Range
The range value of the current bar: High – Low.

Price Range Midpoint
The mid price value of the current bar: (High + Low)/2.

Price Volume Trend
The Price Volume Trend indicator calculates the percentage difference between the price of the previous bar's closusre and that of the the current bar's closure. The volume is multiplied by this percentage and added to a running total. The Price Volume Trend indicator is used to help confirm the strength of a trend by identifying the divergences between the price and volume.

This indicator can signal possible reversals if an increase in price is not accompanied by a similar increase in volume. Generally speaking, if there exists a divergence between a trend's volume and its price, the momentum may be slowing down and a price reversal may occur. As the Price Volume Trend starts accumulating values from the left of the chart, the numeric value of the Price Volume Trend will depend on the data available in the chart. Therefore, the relative value, or trend direction, of the Price Volume Trend is more important than its numeric value.

Rate of Change
The Rate of Change indicator is calculated by dividing the price change during the specified period into the closing price at the beginning of the period. The result is the percentage for which the security's price has changed within the specified period.
When ROC begins to reverse its direction, it is a sign that the current trend is losing momentum.

RSI – Relative Strength Index
RSI measures a market's internal strength, by dividing the sum of up day closing prices into the sum of down day closing prices for a specific period of time. The indicator returns a value within the range from 0 to 100. RSI is one of the classic momentum indicators developed by Wells Wilder. The classic way to interpret RSI is to look for oversold levels below 30 and overbought levels above 70. RSI also often forms chart patterns such as double tops and bottoms and trendlines. Finally, if the underlying prices

make a new high or low unconfirmed by the RSI, such a divergence may signal a price reversal.

R-squared
R-squared is a statistical measure used to determine how much of the price action over the specified period can be explained by the regression line, and how much should be attributed to random noise. R-squared ranges from 0 to 1. The closer R-squared is to 1, the closer the prices have approached the linear regression line. During strong trends, R-squared will remain above 0.5 for an extended period of time.

SMA - Simple Moving Average
Simple moving average is calculated by adding up the prices for the specified number of bars and then dividing the total into the period used. The result is the simple moving average for the current bar.

Long term SMAs are typically used to indicate the trend direction. Prices moving above and below SMA are often used as buy/sell signals. Another common method of obtaining signals is to use two SMAs of different periods and looking for crossovers.

Standard Deviation
Standard Deviation is the statistical measure of market volatility. Standard deviation rises as prices become more volatile. As price action calms down, standard deviation goes down.

Standard Error
The technique is designed for measuring of the standardized variation around the regression line which is based on the price and length parameters. This calculation gives an approximation of the precision of the regression line.

Stochastic Relative Strength Index
For details, refer to "The New Technical Trader" by Tushar Chande.

Statistical Volatility
Statistical volatility is calculated using a standard deviation of the underlying asset price changes from close to close during the past month (normally, 21 days of historical data). This is the most common volatility model currently used.

Stochastic %D
The Stochastic Oscillator measures at how much a price tends to close in the upper or lower areas of its trading range. Stochastic %D is a smoothed version of the Stochastic %K. Stochastic D% is used as a signal line for Stochastic K%. A buy is triggered when Stochastic K% crosses above Stochastic D% from a level, typically, below 30. A sell is triggered when Stochastic K% crosses below Stochastic D%, typically from above 70.

Stochastic %K
The Stochastic Oscillator measures at how much a price tends to close in the upper or lower areas of its trading range. The indicator can range from 0 to 100. Those values that are close to 0 indicate that most of the recent

price action has closed near the day's low, and readings close to 100 indicate that the prices are closing near the upper range.

The classic way to interpret the Stochastic is to wait for Stochastic %K to reach an extreme level. Usually, a level above 70 indicates an overbought condition, while a level below 30 indicates an oversold level. While these penetrations of extreme levels indicate a warning, the actual buy/sell signals occur when %K crosses %D.

Stochastic Slow %D
The Stochastic Oscillator measures at how much a price tends to close in the upper or lower areas of its trading range. The indicator can range from 0 to 100. Those values that are close to 0 indicate that most of the recent price action has closed near the day's lows, and readings near 100 indicate that prices are closing near the upper range.
The Stochastic Slow %D is a doubly smoothed version of the Stochastic %D.

Stochastic Slow %K
The Stochastic Oscillator measures at how much a price tends to close in the upper or lower areas of its trading range. The indicator can range from 0 to 100. Those values that are close to 0 indicate that most of the recent price action has closed near the day's low, and readings close to 100 indicate that the prices are closing near the upper range.

The Stochastic Slow %K is a doubly smoothed version of the Stochastic %K.

Swiss Army Knife Indicator
In his "Swiss Army Knife Indicator" article, John F. Ehlers illustrates the digital filtering concepts.

Please refer to the January 2006 issue of Technical Analysis of STOCKS & COMMODITIES magazine.

Time-series forecast
The Time Series Forecast is used to "predict" the future value of a market by determining the upward or downward bias of a trend and extending that calculation into the future. When the market price is above the indicator, the trend is considered as an upward one. When the market price is below the indicator, the trend is considered as a downward one. Additionally, many analysts believe that when prices rise above or fall below the indicator line, they are likely to pull back to the line. The TSF indicator also monitors the current trend to determine if there has occurred any change in its direction.

TMA - Triangular Moving Average
The Triangular Moving Average is simply a doubly smoothed simple moving average, where the middle portion of the data has more weight.

TRIX - Triple Exponential Average
The Triple Exponential Average (TRIX) is an oscillator used to identify oversold and overbought markets. It can also be used as a momentum

indicator. When the Triple Exponential Average is used as an oscillator, a positive value indicates an overbought market, while a negative one indicates an oversold market. As a momentum indicator, a positive value suggests that the momentum is increasing while a negative one suggests that the momentum is decreasing.Additionally, divergences between price and TRIX may indicate significant turning points in the market.

Two main advantages of TRIX compared to other trend-following indicators are its excellent ability to filter out market noise, as well as its tendency to be a leading rather than a lagging indicator.

TrueHigh
TrueHigh is a numeric value, containing the High of the current bar or the Close of the previous bar, if the latter value is higher.

TrueLow
TrueLow returns a numeric value containing the Low of the current bar or the Close of the previous bar, if the latter value is lower.

TrueRange
TrueRange returns a numeric value containing the difference between the TrueHigh and TrueLow for the current bar.

Typical price
The Typical Price for each bar is calculated as an average of the three following values: high, low and close. Using the Typical Price instead of the close in calculating, say, a moving average weights the high and low into the calculation. Typical Price is known to some traders as the pivot point.

Ulcer Index
The Ulcer Index is a measure of the stress level related to an investment's market behavior. It uses price retracements to measure the "stressfulness." This is done by comparing recent price action with past price action.

Ultimate Oscillator
Williams Ultimate Oscillator uses weighted sums of three oscillators, each using a different time period. These periods represent short-, medium-, and long-term market trends. The Ultimate Oscillator moves within the range from 0 to 100.

It is recommended that one look for divergences between the indicator's value and the price.

Velocity (slope)
Velocity is the slope of the line fitted between the current bar value and the value a specified number of bars ago.

Volatility Indicator
The Volatility indicator calculates and plots a smoothed average of the True Range. True Range measures the conventional range of a bar, but checks the previous bar's closing price to see if it is outside the current bar's range. If it is, this closing price is used instead of the high or

low.Thus, the previous bar's close is considered part of the current bar's range. This helps account for gaps between bars.

This indicator can be used as a tool for measuring the volatility of a market using the price range concept. Often, extremes in Volatility are associated with a change in the market behavior, from trending to the trading range, and vice versa.

Volatility Standard Deviation
The Volatility Standard Deviation indicator calculates the volatility using prices from a specified number of bars. The value returned is one annual standard deviation in price in the form of market price percentage. This indicator is designed to be used with daily bars only.

Volume Average
The Volume Average indicator calculates a 50-bar average of the volume overlaid on the current volume.

Volume Oscillator
The Volume Oscillator indicator calculates the difference between fast and slow volume moving averages. Volume can provide some useful information on the strength or weakness of a price trend. A positive value suggests that there is enough market support to continue the price activity in the direction of the current trend. A negative value suggests that there is a lack of support and prices may start becoming stagnant or reverse.

Volume Rate of Change
The Volume ROC indicator compares the most current bar's volume to that of a bar in the past. The difference is calculated as a percentage and fluctuates around the zero line. Volume can provide an insight into the strength or weakness of a price trend. A positive value suggests that there is enough market support to continue the price activity in the direction of the current trend. A negative value suggests that there is a lack of support and prices may start becoming stagnant or reverse.

Weighted Close Indicator
The Weighted Close is calculated as an average of the high, low and close, with the close getting twice the weight of the high and low. Using the Weighted Close instead of the close in calculating, say, a moving average, weighs the high and low into the calculation.

Weighted Moving Average
Weighted Moving Average is calculated by multiplying the first data point by 1, the second by 2, the third by 3, and so on. The final result is then divided into the total of the weights. More recent data is thus more heavily weighted, and contributes more to the final WMA value.

The rule for interpreting WMA is slightly different from that for SMA, because it is a more sensitive indicator. When WMA changes its direction, it signals a change in the trend.

Williams' Accumulation/Distribution
Unlike the classic Accumulation Distribution, the Williams' Acc-Dis indicator does not include the volume in its calculation. Typically, the Williams Acc-Dis indicator is used to identify divergences between the price activity and the indicator itself. Just like with any other kinds of divergences, if the market reaches new highs while the indicator is stagnant or falling, the current trend may be weakening, thus suggesting a possible reversal. Conversely, if the market reaches new lows while the indicator is stagnant or rising, the trend may be weakening, thus signaling a possible reversal.

WTop Inter Indicator
The WTop Inter Indicator shows that a current bar belongs to a double top/button figure. The indicator is calculated using the same algorithms as those used for calculating the Reversal Patterns study. For those bars that form a double top, the indicator is 1. For those bars that form a double bottom, the indicator is -1.

WTop Major Indicator
The WTop Major Indicator shows that a current bar belongs to a double top/button figure The indicator is calculated using the same algorithms as those used for calculating the Reversal Patterns study. For those bars that form a double top, the indicator is 1. For those bars that form a double bottom, the indicator is -1.

WTop Minor Indicator
The WTop Minor Indicator shows that a current bar belongs to a double top/button figure. The indicator is calculated using the same algorithms as those used for calculating the Reversal Patterns study. For those bars that form a double top, the indicator is 1. For those bars that form a double bottom, the indicator is -1.

Chapter 9

Analytical Studies

The following analytical studies are available with a single-click:

Auto-trends
The Auto-trends tool is used to automatically draw trends lines over the chart. The tool provides automatic trend lines identification for minor, intermediate and major trends.

Pivots
This study identifies and marks a turning point in the trend on a chart. Tradecision identifies Minor, Intermediate or Major turning points. Pivots are useful as the start or end points when drawing objects (such as Fibonacci retracements) or other analytical studies are used..

Single Day Patterns
This kind of patterns is used for the identification of single-bar patterns, such as runaway and thrust days.

Reversal Patterns
Automatic identification of reversal patterns, such as V-top, double-top, head and shoulders.

Elliott Wave analysis
An exceptional tool for those traders who have used counting Elliott waves to make trading decisions. The tool includes automatic identification of a-b-c corrections.

Fibonacci Clusters
The tool is used for calculating price levels using pivots and Fibonacci retracements. It allows you to determine the probability of a trend reversal for the each price level.

Noise Removal
The Noise Removal tool allows you to create and analyze the smoothed curve of a price chart.

Auto-Trends

Understanding the Auto-trends study

The Auto-trends study is used to automatically draw trend lines over a chart. Usually, the break of an auto-trend (similar to trendlines) shows an entry or exit signal.

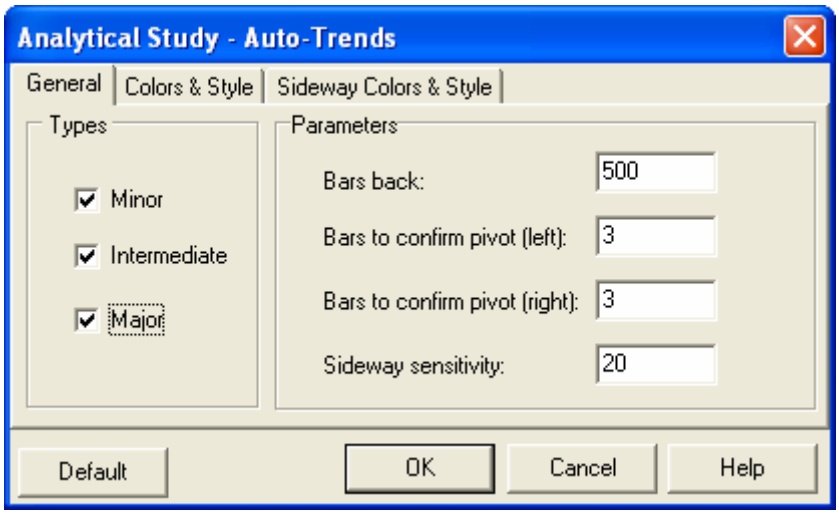
Auto-trend types

There are the following three types of auto-trends in Tradecision:

Minor duration trend, lasting less than a week. Over the long haul, this trend has very little potential.

Intermediate duration trend, occurring within a period of time that exceeds one week but is within 1-2 months.

Major duration trend, lasting longer than one or two months. Long-term trends indicate stability. This is the trend to trade with in most cases.



The study also identifies **sideway trends**, or, in other words, those periods when the trend direction is not clear. Sideway trends are marked with horizontal lines.

To run the Auto-trend analytical study:

1. From the **Insert** menu, point to **Analytical study,** and then click **Auto-Trends**.

2. In the *General* tab of the *Analytical study – Auto-Trends* dialog box, select the type of the analytical study that you want to run by selecting the corresponding check box.

   The following options are available:

- **Minor**,
- **Intermediate**
- **Major**.

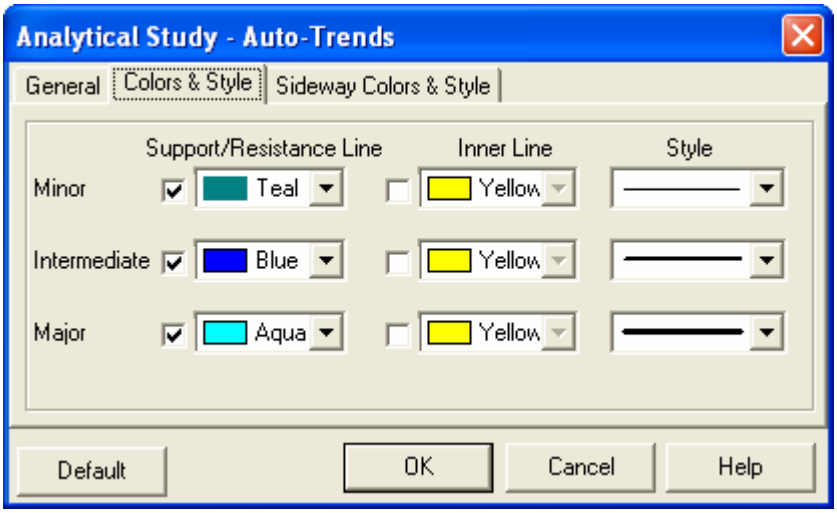
3. In the **Parameters** area, change the algorithm parameters, if required.

4. Click **OK**.

To change the color of the auto-trends:

1. From in the *Color & Style* tab or *Sideway Color & Style* tab of the *Analytical study – Auto-Trends* dialog box, select the color for support, resistance and inner lines.

   ***Note**: You can choose different colors for Minor, Intermediate and Major lines, as well as a separate color for sideway trends.*



2. Click **OK**.

Tuning the Auto-trends Algorithm

Advanced users can use the following parameters to fine-tune the auto-trends algorithm:

Bars Back

Using this parameter, you can select an area where you want to run the analytical study.
Generally, one bar means one trading day. Nevertheless, you can also use weekly or monthly bars.

Bars to confirm a pivot (left/right)

This parameter defines the number of bars to the left/right from the pivot point that should be lower or higher than the pivot bar. Decrease this parameter to increase the algorithm sensitivity and identify smaller trends.

Sideway Sensitivity

This parameter defines the level of sensitivity of trend categorization. The higher the parameter, the fewer price fluctuations will be identified as upward/downward and not sideway trends.

Pivots

Understanding the Pivots Study

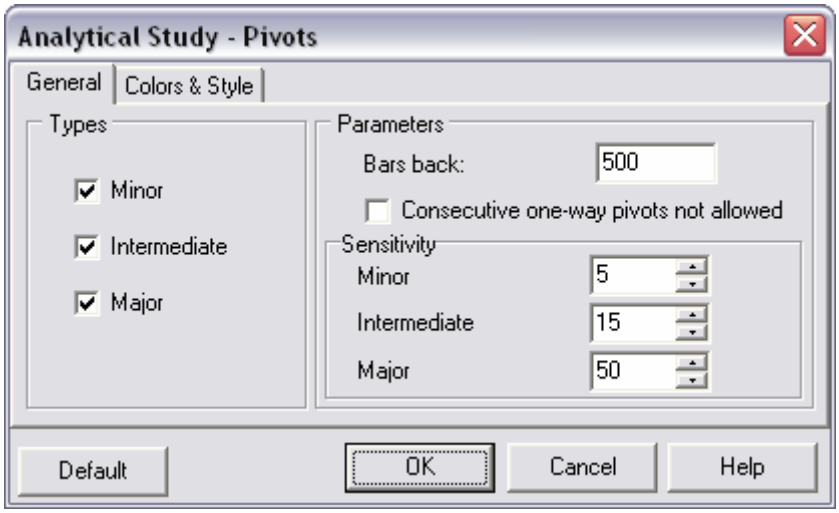
This study identifies and marks a turning point in the trend on a chart. Tradecision identifies Minor, Intermediate or Major turning points. Pivots are useful as the start or end points when drawing objects (such as Fibonacci retracements) or other analytical studies are used.

To run the pivots analytical study on a chart:

1. From the *Insert* menu, point to **Analytical study,** and then click **Pivots**.

2. From the *General* tab of the *Analytical study - Pivots* dialog box, select the check box next to the type of the study that you want to run. The following options are available:

- **Minor**,
- **Intermediate**
- **Major**



3. In the **Bars back** box enter the number of bars that you want to analyze with the study.

4. From the **Sensitivity** area, you can modify the sensitivity ratio for the Minor, Intermediate and Major pivots.

***Note**: With the sensitivity ratio, you can fine-tune the proprietary algorithm used to identify pivots. The smaller the sensitivity parameter you define the less demanding algorithm will be and even tiny trend reversals will be identified as pivots. Correspondingly, a bigger sensitivity ratio will filter out "insignificant" pivots.*

5. If you do not want to have several pivots in the same direction, select the **Consecutive one-way pivots not allowed** check box.

6. Select the **Color & Style** tab and customize the pivot labels.

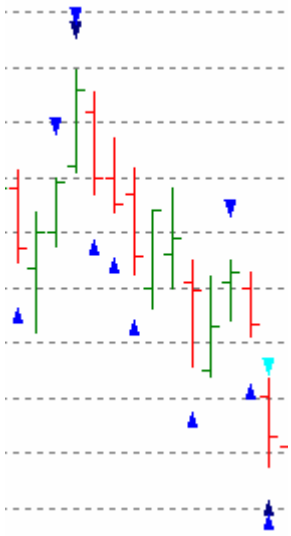
***Note**: You can change the text used to mark pivots as well as color and font for this text.*

7. Click **OK**.

Single-Bar Patterns

Understanding the Single-Bar Patterns Study

Single-Par Patterns indicate those changes in a price that occur in a single trading day or bar if your use a minute time frame. The study identifies the following patterns: Gaps, Thrust days, Run days, Wide-Ranging days.



Gap

A gap forms when opening price movements create a blank spot on the chart. This happens when the high of the day is below the low of the previous day, or when the low of the day is above the high of the previous day.

Gaps are especially significant when accompanied by an increase in volume.

Thrust Days

An **Upper Thrust day** is a day when the market is closed higher than the maximum of the previous day.

A **Lower Thrust day** is a day when the close price is formed lower than the minimum of the previous day.

Run days

Run days are the days with a pronounced trend.

Wide-Ranging days

Wide-ranging days have a true range that is far larger than the days on either side and are especially meaningful after a strong trend.

After a sharp down-trend, followed by a wide-ranging day with a strong close is a signal that the trend will reverse.

After a strong advance, a wide-ranging day with a weak close signals a downside reversal.

Extreme wide-ranging days often precede a major trend reversal.

Running the Single-Bar Patterns Study

To run the Single-Bar patterns analytical study:

1. From the **Insert** menu, point to **Analytical study,** and then click **Single-bar patterns**.

2. From the *General* tab of the *Analytical study – Single-bar patterns* dialog box, select **Gaps**, **Run Days**, **Thrust Days** or **Wide-ranging days** check boxes.

3. In the **Bars back** box, enter the number of bars that you want to analyze with the study.

4. Select the *Color & Style* tab, and select the color for each pattern.

5. Click **OK**.

Patterns will be marked with colored triangles.

You can use the following parameters to customize the pattern identification algorithm:

- **Run day length.** The number of days to the right and to the left used to confirm the run day pattern.

- **Thrust day ratio.** Used to filter week thrust days. The ratio is a percentage amount that specifies for how much the thrust day close should be higher or lower than the High or low of the previous day.

- **Wide-ranging day ratio.** Defines the volatility threshold used to identify wide-ranging days. The volatility threshold is equal to the average true range of the day divided to the average true range of the previous X (Wide-ranging day length) bars. If the volatility threshold is equal to or greater than the wide range ratio, the day will be identified as a wide-ranging day.

- **Wide-ranging day length.** The number of the previous bars relatively to current bar.

Reversal Patterns

Understanding the Reversal Patterns Study

Reversal patterns, or tops and bottoms, indicate a radical change in a long-term trend.

Tops are usually less stable and shorter than bottoms. Bottoms usually have smaller price variations and are slower to set up.

A breakout through a trend line is used together with a reversal pattern for monitoring price level- and timing-related signals.

The longer the time required for the formation of a pattern and the greater the price fluctuations within it are, the more substantial the forthcoming price movement is likely to be. The time frame is, normally, from several days to several months. Intraday patterns are much less reliable.

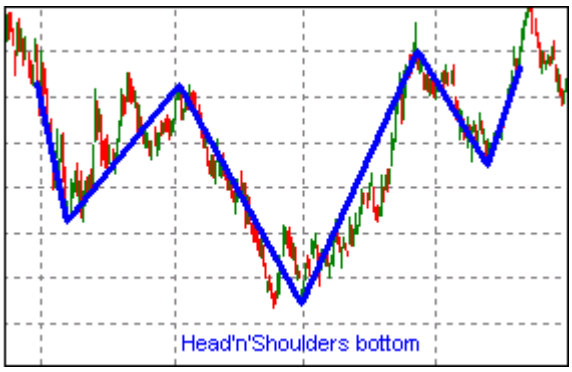
Reversal patterns offer some of the most important opportunities for entering a market with a good profit potential. They usually represent fundamental changes in the underlying character of a particular market, and often go on to yield big moves.

However, a market top or bottom is often difficult to identify. It is even more difficult to choose the appropriate entry and exit points. One of the related problems is distinguishing between the actual change in a trend and a mere congestive phase in the middle of a move. In most cases, it is advisable to wait for prices to actually confirm a trend reversal by developing one of these well-tested and reliable reversal patterns. The actual buy or sell signals are based on a breakout in the direction of the new trend.

The most popular Reversal Patterns include: head and shoulders, double tops and bottoms, and V-Top.

Head and Shoulders

The head and shoulders pattern is formed by three peaks. The center peak, or head, is somewhat higher than its two lower, and not necessarily symmetrical, shoulders. The line connecting the bottoms of the two shoulders is called the neckline. Due to unsteadiness, the neckline is seldom symmetric or precisely horizontal.



The pattern is not complete until the neckline is broken. It is advisable to wait for confirmation.

Volume should be assessed to confirm the validity of reversal patterns. Volume is, normally, the heaviest during the formation of the left shoulder. It also tends to be quite heavy when a price is approaching the peak. The real confirmation of a developing Head and Shoulders pattern comes with the formation of the right shoulder, which is invariably accompanied by a distinctly lower volume.

Double Top

This pattern consists of two tops of almost equal height. A line is drawn below and parallel to the resistance line which connects the two tops. The neckline is a strong support for price level but eventually fails.

As with a Head and Shoulders, after the two rallies and their respective reversals are completed, the double tops is confirmed only when the neckline is broken. The support line then becomes a resistance line, which often holds a market rebound.

A Double Bottom pattern is a mirror image of a double top pattern: the average height of the bottoms gives a good indication of the price objective.

V- Top

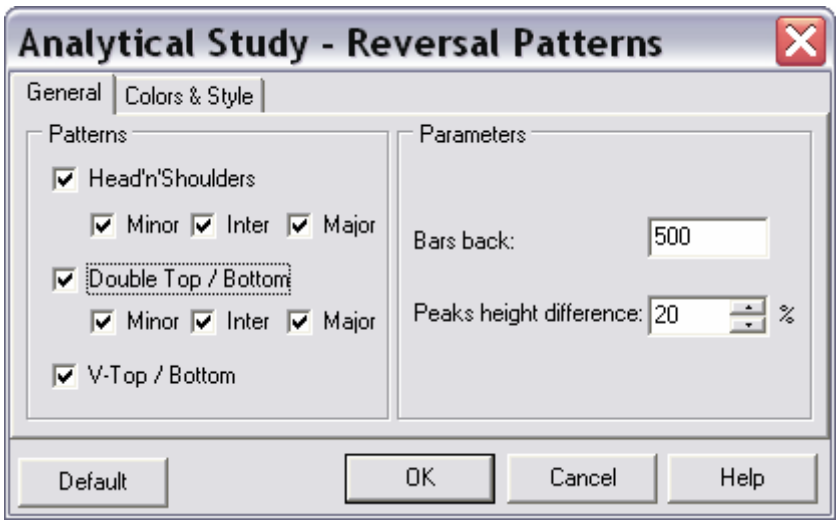
The V-Top pattern is an unusual pattern in that a sharp trend switches from one direction to the other without warning and a high volume at or just after the turnaround.

To run the Reversal Patterns analytical study:

1. From the **Insert** menu, point to **Analytical Study**, and then select **Reversal Patterns**.

2. From the *General* tab of the *Analytical Study - Reversal Patterns* dialog box, you can select the Reversal Patterns you need by selecting the corresponding check box. The following options are available:

- **Head'n'Shoulders**
- **Double Top / Bottom**
- **V-Top / Bottom**



3. Select the corresponding check boxes next to the patterns. The following options are available:

- **Minor**
- **Inter**
- **Major**

4. In the **Bars back** box enter the number of bars that you want to analyze with the study.

5. From the **Peaks height difference** list, select the desired distance between the peak heights.

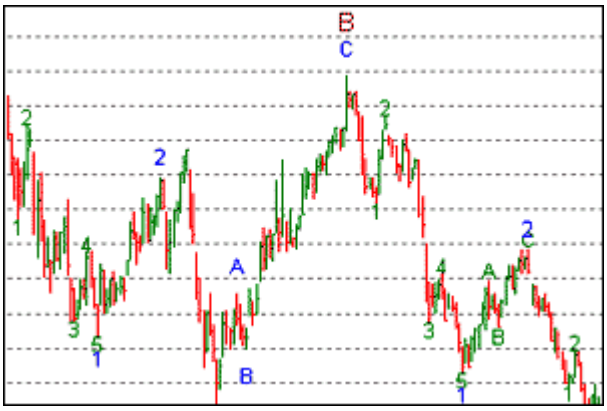
6. Click the **Color & Style** tab and select the necessary color for each pattern. You can also change the line style in the corresponding drop-down list boxes.

7. Click **OK**.

Elliott Waves

Understanding the Elliott Waves Theory

Many traders use Elliott's ideas to analyze changes in trends. Tradecision offers a special study that identifies Elliott waves and corrections. Even though some professional traders do not agree with some of Elliott's findings, he should definitely be admired for his ideas, many of which are useful in analyzing the market moves. The Elliott wave study is designed specifically for devoted Elliott Waves analysts.



The study uses a simplified version of the Elliott Wave theory which holds that a price usually makes a 5-wave pattern in one direction, followed (in most cases) by a corrective pattern, and then a new 5-wave pattern in the opposite direction.

A Brief Overview of the Elliott Waves Theory

In 1939, **Ralph Nelson Elliott** published a pattern-recognition technique, which holds that the stock market follows a rhythm or pattern of five upward waves and three downward waves to form a complete cycle of eight waves. The three downward waves are referred to as a "correction" of the preceding five upward waves.

Wave is a movement in the market, either upwards or downwards. The size of the wave depends on the period of time that is being analyzed. Impulse Wave is a wave that moves in the direction of the main market trend. It subdivides into 5 smaller waves (1-2-3-4-5). Waves 1, 3, and 5 move in the direction of the main market trend. Waves 2 and 4 move against the main market trend.

Corrective Wave is a wave that moves in the direction opposite to the direction of the main market trend. It subdivides into 3 smaller waves (a-b-c). Waves a and c move against the main market trend. Wave b moves in the direction of the main market trend.

Types of Impulse Waves

The basic 5-Wave Structure (1-2-3-4-5) is the following: if the main trend is upward, wave 3 is higher than wave 1..., wave 5 is higher than wave 3..., and wave 4 does not correct below the top of wave 1. If the main trend of the market is downward, wave 3 is lower than wave 1..., wave 5 is lower than wave 3..., and wave 4 does not correct above the bottom of wave 1.

Extended Wave - a complex impulse wave where one of the subwaves (either 1, 3, or 5) further subdivides into 5 waves.

Failure - when the 5th subwave of an impulse wave fails to move beyond the end of the 3rd subwave...indicating a strong and/or prolonged move in the counter direction.

Diagonal Triangle - a terminal wave (often called a wedge), either a 5th wave or c wave, where the 5 subwaves subdivide into three (a-b-c). Upon completion, there is usually a strong move in the opposite direction.

Other Elliott Concepts

Wave Degree - every 5-wave and 3-wave cycle can subdivide into waves of a smaller size and/or be found to comprise part of a wave of a larger size. Waves can be labeled in degrees, which last only a matter of minutes or as long as centuries.

Parallel Trendlines - waves tend to channel between parallel trendlines. Depending on the time period analyzed, the market may channel between parallel trendlines on an arithmetic scale chart or on a semi-log scale chart.

Extent of Corrective Wave - commonly, a corrective wave will take the market to the area of the 4-th wave whose degree is one point lower, especially when the corrective wave itself is the 4-th wave. In other cases, the market will often find support at the top of wave 1 of one lesser degree.

Rule of Equality - two of the subwaves of an impulse wave (1, 3, or 5) are often related equally in terms of price advance and time.

Rule of Alternation - waves, and corrective waves in particular, tend to vary in complexity and/or type from one to the next.

Running the Elliott Waves Study

To run the Elliott waves analytical study:

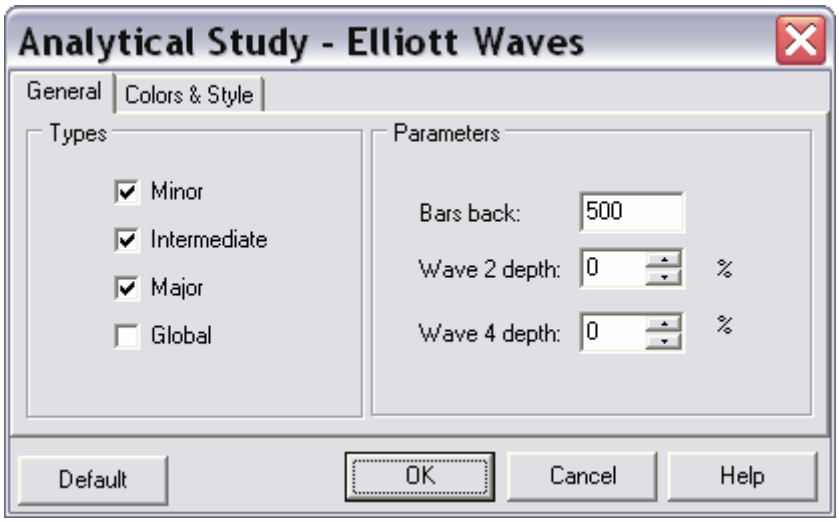
1. From the **Insert** menu, point to **Analytical study,** and then select **Elliott Waves**.

The *Analytical study - Elliott Waves* dialog box will be displayed.

2. In the **Types** area of the *General* tab of the *Analytical study - Elliott waves* dialog box, select the options you need by selecting the corresponding check box.

   The following options are available:

- **Minor**
- **Intermediate**
- **Major**
- **Global**



3. In the **Parameters** area, enter the **Wave 2 depth** and **Wave 4 depth** values.

4. In the **Bars back** box, enter the number of bars that you want to analyze with the study.

5. Click the *Colors & Style* tab and select the necessary color and font to be used for Minor, Intermediate, Major and Global waves.

6. Click **OK**.

   Waves and corrections will be marked with the corresponding numbers and a-b-c symbols.

   ***Notes**: In the **Parameters** area, you can change two parameters that allow identifying occasional spikes or outliers that may deteriorate the correct wave numbering.*

Wave 2 depth *parameter specifies the percentage for which Wave 2 can overlap the bottom of Wave 1 before the wave numbering is considered invalid.*

Wave 4 depth *parameter specifies the percentage for which Wave 4 can overlap the top of Wave 1 before the wave numbering is considered invalid.*

Custom Elliott Waves

You can use the **Custom Elliott Wave toolbar** to manually insert wave numbers into a chart. Once added, a wave number can be repositioned anywhere by clicking it and dragging it to its new position.

To mark a custom Elliott Wave in a chart:

1. Right-click the toolbar area and select **Elliott Waves**.

2. From the list in the Custom Elliott Waves toolbar, select

- **Minor**
- **Intermediate**
- **Major**
- **Global**

In the Custom Elliott Waves toolbar, click wave **1, 2, 3, 4, 5, A, B, C, D** or **E** and then click the place in the chart where you want the number to appear. Repeat this process for all the wave labels that you want to insert into the chart.

Note: *The font and style of the custom Elliott Wave tool are the same as the Elliott Wave analytical study. To change its properties, see the Color & Style Toolbar, and Elliott Wave analytical study.*

Fibonacci Clusters

Understanding the Fibonacci Clusters Study

Using Fibonacci Clusters you can determine the probability of a trend reversal for each price level**.** Fibonacci Clusters indicate the price level on which a potential change in the trend may occur. The stronger the cluster, the greater the likelihood that the price level is a support or resistance level for the current trend.

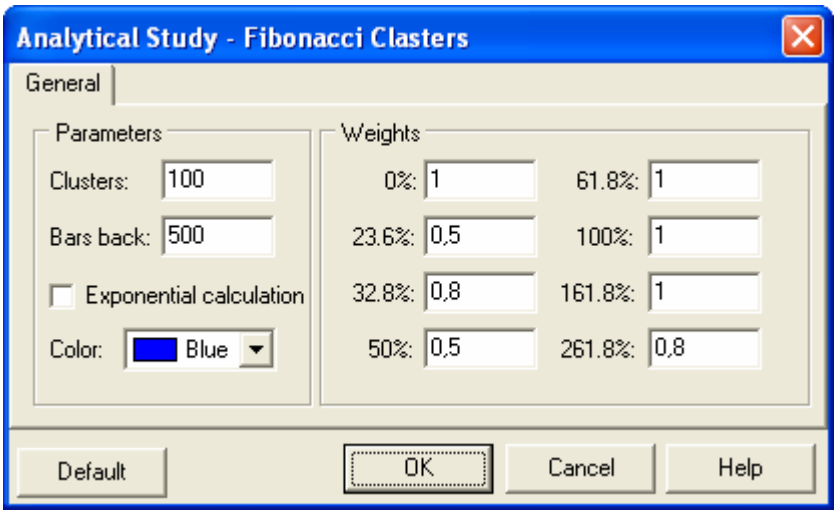
Fibonacci Clusters were not designed to be used alone. They should be used as a confirming indicator or to determine where a change in a trend may potentially happen.

Fibonacci Clusters are calculated using the following procedure: the price range of a security is divided into a specified number of sub-ranges (clusters). After that, Tradecision uses all pivots (minor, intermediate and major) to form all possible Fibonacci Levels (Retracements and Extensions). The more Fibonacci Levels are assigned to a cluster, the stronger the cluster is.

To run the Fibonacci Clusters analytical study on a chart:

1. From the **Insert** menu, point to **Analytical study,** and then select **Fibonacci Clusters**.
   The *Analytical study - Fibonacci Clusters* dialog box will be displayed.

2. In the **Clusters** box of the **Parameters** area, enter the number of clusters you that want to form.



3. In the **Bars back** box, enter the number of bars that you want to analyze with the study.

4. If you want the pivot points found at the end of the price data massive to have greater weight than that of the pivot points found at the massive's beginning, select the **Exponential Calculations** box,.

5. From the **Color** list, select the color that you want to use to draw the study.

6. In the **Weights** area, enter the importance ratio for each Fibonacci level.

   Note: *The bigger the ratio, the stronger will be the level's influence on the cluster strength.*

7. Click **OK**.

   The study will be drawn at the end of the price chart. Stronger clusters will be marked with stronger color, weak clusters will be marked with white color.

Noise Removal

Understanding the Noise Removal Technique

Noise removal is an important task in many technical analysis techniques. With the help of the analytical study, you can avoid any untimely reactions to frustrated trends and occasional short-term price changes within a trend. The Remove Noise capability allows evaluating the market's current state and, consequently, making more effective trading decisions.

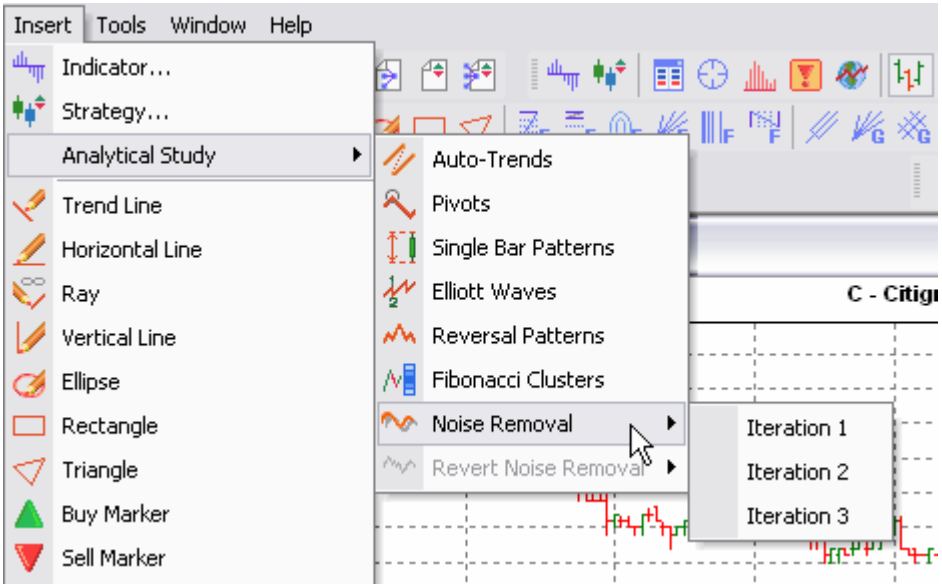
The Remove Noise functionality enables creating and analyzing a smoothed curve of a price chart . There are 3 levels of smoothing that enable you to manage different degrees of noise removal. You can try different levels of noise reduction to find out which one suits you the best.

To remove noise from a price chart:

1. From the **Insert** menu, select **Analytical Study**, go to **Noise Removal**, and select a level of smoothing (iteration) you need. You can select **Iteration 1**, **Iteration 2** or **Iteration 3**.

Note: *After applying the Noise Removal study, you can see which level of noise reduction is currently applied to the chart by looking at the* ***Status Bar****. The Status Bar is an area that displays state information for the content placed at the bottom of a window.*

Note: *If you use Noise Removal study, only smoothed price data will be used by simulations, models, and so on, and not the original market data of the security.*



To cancel the application of the Noise Removal study to a price chart:

1. From the **Insert** menu, select **Analytical Study**, go to **Revert Noise Removal** and then select an iteration that you want to cancel.

Chapter 10

Improvian Language

Introduction

Oftentimes, reacting too emotionally causes traders to make hasty decisions. This results in their losing part of their funds or even the whole of the balance in their accounts. That is why, many successful traders believe that using system-based trading or rules is the competitive advantage they need.

To get familiar with the capabilities of the language and its structure, refer to the Tradecision Improvian Guide.

What is Improvian?

Improvian is a full-featured programming language. It gives you a variety of opportunities to implement your own trading ideas. For example, you can design a trading system or improve an existing study or indicator.

Tradecision makes it easy to limit losses by coding the trading rules using the powerful features of Improvian. It is possible to create custom functions, call DLL functions, and import trading techniques from EasyLanguage and MetaStock. For creating advanced trading techniques, the new language allows traders to use variables, inputs and skip words.

What can you create?

With Improvian, you can create **analysis techniques** that can help you make a **profitable trading decision**. Inventing your own techniques isn't easy. First of all, you need an idea. Then you need to write that idea down. Improvian will allow you to write down any kind of idea you can only come up with, and Tradecision will inform you about how well your trading idea performs.

With Improvian you can create:

- Trading system rules (using the Strategy Builder capability);
- Inputs for Neural Models;
- Indicators (using the Indicator Builder capability);
- Custom Functions;
- Alerts (using the Alert Builder capability);
- Studies (using the Study Builder capability);
- Custom scans (using NeatScan market scanner).

In addition, you can copy and modify any of the built-in trading strategies, studies, indicators, and functions provided by Tradecision.

Using Improvian, you can create analysis techniques which you believe can help you to make a profitable trading decision. It is not easy to invent your own techniques. First, you need an idea. With Improvian you can write it down. Tradecision software will show you how the ideas perform as new bars appear.

You can analyze hundreds of thousands of data entries to locate patterns and opportunities. For example, with NeatScan market scanner, you can scan the whole database in Data Manager for buy/sell signals defined by you. In Strategy Builder, you can back-test and optimize large amounts of historical data to find the best possible parameters for your trading system.

In addition, Tradecision offers advanced simulation capabilities (Simulation Manager) to help you easily identify the advantages and disadvantages of a strategy.

Moreover, you can test your own money management rules defining them with Improvian. As traders know, money management is the most important part of successful trading. And Tradecision provides you with a powerful Money Management Editor. For your convenience, the most popular money management rules are predefined and easily accessible.

Tradecision can store an unlimited number of technical analysis techniques.

For specific tutorials on each of the formula-based tools (Indicator Builder, Strategy Builder etc), refer to specific chapters dealing with them.

Understanding the Language

Improvian can be accessed from Improvian Editor, a special word processor that allows you to write down your trading ideas in the form of a strategy, indicator, study, and so on, using specific syntax.

Improvian is comprised of a combination of reserved words, operators, functions, parameters and punctuation.

Tradecision's Improvian Dictionary includes a collection of built-in functions, covering many of the most popular trading techniques. These include all types of Moving Averages, Volatility, Momentum, chart patterns, to name but a few.

All language constructions are not case sensitive, for example, "IBM" is equivalent to "ibm".

Basic Elements of the Language

Combinations, allowed in an expression

Operations	Operand	Operations Value
+,-,*,/	Numeric	Numeric
+	String	String
<, >, =,>=,<=,<>	Numeric	Boolean
=,<>	String	Boolean
not, and, or	Boolean	Boolean

Syntax Characteristic in Builders

Trading Technique	**Characteristic**
User Function	Inputs and optimized variables are prohibited
Strategies	Inputs are prohibited
Indicators	Optimized variables are prohibited
Studies	Optimized variables are prohibited
Models	Inputs are prohibited
InputExp	Single expression is allowed

Operator Semantics

Operator	Operand	Semantics
(unary) -	Numeric	Changes an operand value to the opposite one.
+	Numeric	Sums the values of two numbers.
+	String	Makes bonding of two rows; the first row succeeds the second one.
-	Numeric	Subtracts from a value of the first operand the value of the second operand.
*	Numeric	Multiplies a value of the first operand by the value of the second operand.
/	Numeric	Divides the value of the first operand into the value of the second operand.
<	Numeric	Returns **True**, if the first operand is less than the second operand.
>	Numeric	Returns **True**, if the first operand is greater than the second operand.
<=	Numeric	Returns **True,** if the first operand is less or equal to the second operand.
>=	Numeric	Returns **True**, if the first operand is greater or equal to the second operand.
=	Numeric	Returns **True**, if the first operand is equal to the second operand.
<>	Numeric	Returns **True**, if the first operand is not equal to the second operand.
=	String	Returns **True**, if a symbol string of the first operand is identical to a symbol string of the second operand.
<>	String	Returns **True**, if a symbol string of the first operand is not identical to the symbol string of the second operand.
(unary) not	Boolean	Returns **True**, if the value of an operand is **False**. Otherwise, **False**.
and	Boolean	Returns **True**, if the values of the first and second operands are **True**. Otherwise, returns **False**.
or	Boolean	Returns **True**, if the value of at laest one of the operands is **True**. Otherwise, returns **False**.

Operator Precedence

All operations should be executed in accordance with the rules of the operator precedence. Equal precedence operations must be made from left to right. For example: *2+3+4 = (2+3) + 4*. The parentheses () create the maximum precedence of a sub-expression.

The following is the Operator Precedence table:

Operator

Not,-
/,*
+,-
<=,>=,>,<,=,<>
And
or

Function

Function – is a command to perform a specific mathematic calculation. Each function has a name and returns a value based on some underlying calculation. Improvian includes a large number of built-in functions. Functions can be accessed from Improvian Editor.

For example: Average True Range function.

function (Length:numeric):Numeric;
return SMA(TrueRange(), Length);

For a complete list of all built-in functions, refer to Tradecision's Improvian Guide.
Many functions require parameters that provide the information needed to calculate the function value. Even if a function does not require any parameters, it must be followed by a pair of parentheses.

For example, *AutoTrendMinor()*

A function can be nested into another function. Functions can be combined using mathematical operators.

Variables

Variables are placeholders that hold a value. Once you assign a value to a variable, you can reference the value throughout the trading technique or function by using the name of the variable. You can also recalculate the value of the variable within the procedure.

Using variables instead of frequently-used expressions speeds up the procedure and uses less memory. You can declare variables, assign values to them, and reference their values.

The value stored by the variables can change any number of times throughout the procedure, even from bar to bar. The main purpose of a variable is to store the result of a calculation or comparison to enable further referring to the result of this operation later without having to repeat the formula or expression.

For example,

```
var
   opt1:=#;
   opt2:=#;
end_var
```

Arrays

Arrays are variables that store multiple values concurrently. Like variables, arrays are place holders that can hold values, although instead of being able to hold only one value, they can hold as many values as the number of elements they have available.

Arrays are used for many reasons, the most common being to store information about relevant market conditions during the analysis of price data—to store information about what happened during previous bars.

Arrays can store either numeric, true/false, or text string expressions, but they can only store one type of expression at a time. Also, the values in all elements of the array are carried forward from bar to bar.

When working with arrays, you declare an array, assign values to the elements of the array, and reference the values of the elements within an array.

For example, sorting of PriceArray arrays in the ascending order:

```
Var
    Array: PriceArray[10]:=0; {declaring array}
    I:=0;j:=0;tmp:=0;{declaring indexes}
End_var

{sorting array}
for i:=1 to 9  do
    for j:=I+1  to 10 do
        if PriceArray[i]<PriceArray[j] then
            begin
            tmp := PriceArray[i];
                PriceArray[i] := PriceArray[j];
                PriceArray[j] := tmp;
            end;
```

Inputs

Inputs are parameters or replaceable values used in the calculation of a trading technique. Instead of using fixed values for an indicator or strategy, you can modify these values as you apply a trading strategy to a chart.

The Input statement allows you to declare a named value that can be changed when you apply the strategy or analysis technique to a chart. You can use Inputs in the strategy you just created to allow the number of days for the fast and slow moving average to be changed by the user instead of using the fixed values of 9 and 18.

Similar to when you declare a variable, you declare the name of each input along with its initial value (in parentheses). You can use the named values in your calculations just as you would the number.

Example:

```
Inputs
    priceData:"price data",close;
    l:"Length",10;
End_inputs
```

Reserved Words

Reserved words (skip words) each have a specific meaning or purpose. For example, to display values or create objects in a window, perform a trading action, or evaluate and manipulate data.

if a>2 then a:=2;
if, then - are reserved words

The following keywords are reserved to identify price fields:
- Open
- High
- Low
- Close
- Volume
- OI

The following keywords are reserved to be used in Boolean expressions:
- True
- False
- AND
- OR
- NOT

In the Improvian's **Function Reference,** you will see if a function is used as a reserved word.

For example,

Name: Low
Full name: Low
Syntax: Low
Description: Returns Low value specified number of bars ago.
Returns: A numeric value
Example: Low
Reserved Word: Yes

-OR-

Name: TIMESERIES
Description: Reserved word used as a function parameter for identification of TIMESERIES smoothing method.

You can create your own reserved (skip) words. See Improvian tab chapter.

Value

Value - the value can be:

- Numeric;
- Boolean (also called logical or true/false);
- String (text);
- Array.

Numeric expressions can be literal. In other words, they can be a number or they can be a reserved word that represents a numeric value, for example, Open.

A string (**text)** expression is any symbols (no more than 1000) within quotation marks. The following is an example of a string expression:

"This is a string expression".

Boolean or True/false expressions can be either the value **True** *or* **False***,* or an expression that evaluates to True or False. True/False expressions invariably involve a comparison. The following is a true/false expression, it evaluates to a value of True or False:

Open > Close

Arrays are variables that store multiple values concurrently. Like variables, arrays are place holders that can hold values, although instead of being able to hold only one value, they can hold as many values as the number of elements they have available.

The Improvian language supports operations with **infinite values**.

1). Numerical operations: the result of any numerical operation with an indefinite value will be an indefinite value.

2). Logical operations: an indefinite value will be equal to 0, for example, INF < 0, INF >0, whereby INF, – the function returning the indefinite value, – will have the value *FALSE*, and INF=0 will be *TRUE*.

3). String arithmetic: an indefinite string is equivalent to an empty string.

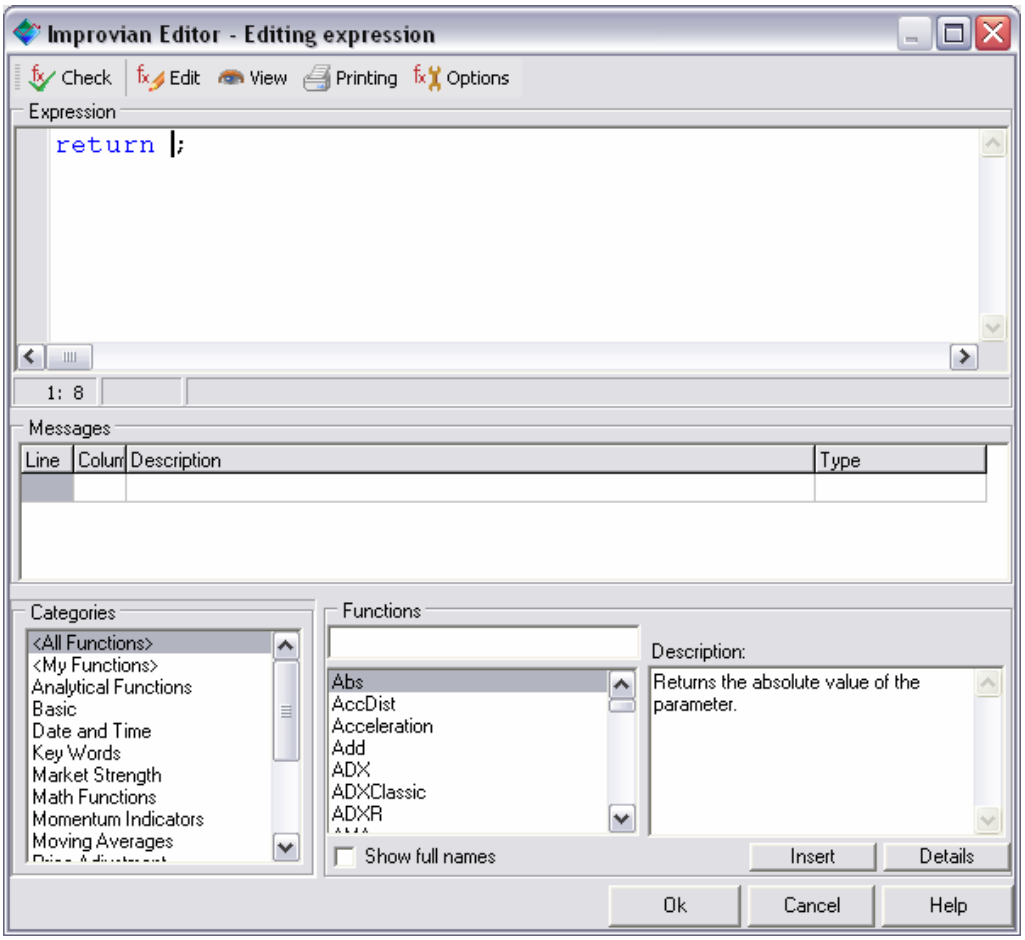
Using Improvian Editor

Improvian Editor is a special word processor, allowing you to write your own formulas in the Improvian language. Improvian Editor is automatically displayed in a separate window when you are creating or editing a function, strategy, indicator, study, alert, or when you are scanning or inputting data into a neural model.

To write correctly in Improvian, you need to learn the principles of the language's syntax. The Editor contains syntax checker that ensures that your formula contains only correct expressions, function names and parameters. Therefore, if you make a mistake in an expression you will receive a message telling you what kind of mistake you have made. You can only save an expression containing correct syntax. This means that if a trading technique has any incorrect language rules and/or spelling written in Improvian, they will not validate and you will not be able to insert it into a chart.

Improvian Editor:

- Provides all the functionality of a text editor;
- Has the ability to highlight lexical and syntax constructions & syntax errors.
- Provides auto-expansion of a word from the dictionary after only a few letters are entered;
- Includes a list of errors;
- Allows Undo & Redo, Cut & Paste.



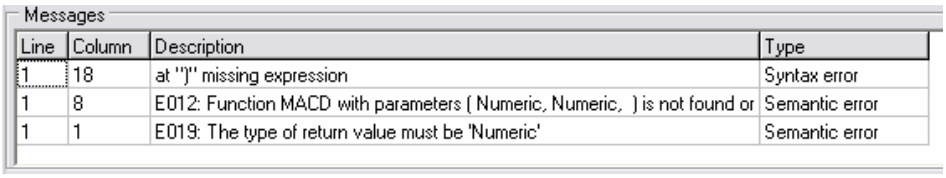
Note: *The following must needs to be used:* ***1) RETURN*** *at the beginning of the one-formula expressions and at the end of complex scripts;* ***2) ;*** *at the end of expressions.*

To enter an expression:

1. Type the expression in the **Expression** box.

2. Click **Check** to verify the syntax and grammar.

If an error has occurred, a message explaining the error will be displayed in the **Messages** box.



3. Correct the errors, if any.

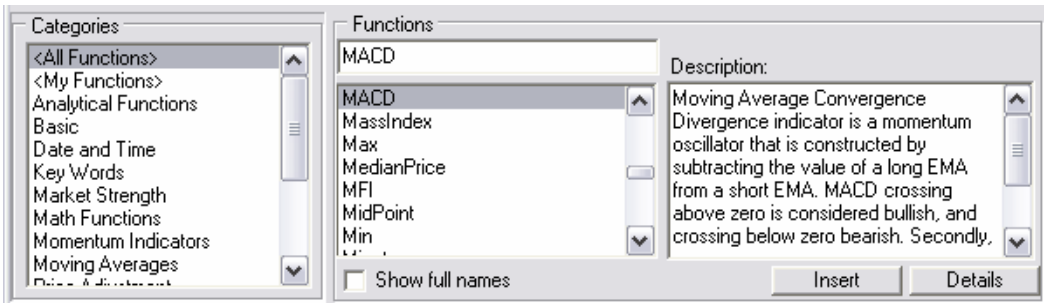
4. If the trading technique is correct, click **OK** to save it.

To create a trading technique:

1. In the **Categories** area, select the appropriate category.

2. In the **Functions** area, select the function you need, or just type the required function under **Functions**.

You can read the description of the selected function in the **Description** box.



3. Select the highlighted function and click **Insert** (or double-click it).

The selected function will appear in the **Expression** text box.

4. If the trading technique is correct, click **OK** to save it.

Viewing the Details of a Function

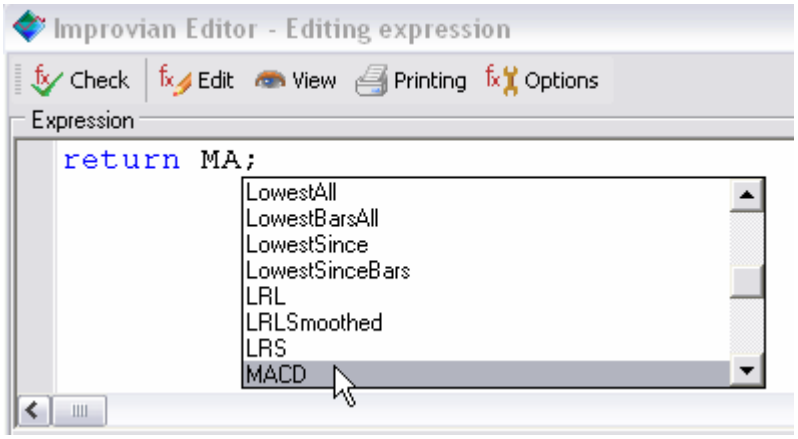
To view the function details:

1. To see the details of a function, click the **Details** button

Using AutoComplete

To turn on AutoComplete:

1. In the **Expression** box, enter the first letter of the built-in function and press **Ctrl-Space** or right-click to select **AutoComplete** from the list.



The capability provides auto-expansion of a word from the Dictionary when only a few letters are entered.

Using Variables

To speed up the calculation of formulas, variables can be used. Rather than repeating an expression or formula again and again, you can assign it to a variable and then reference the variable.

Using Upper and Lower cases

It does not matter which case is used for entering formulas (for example, "A" and "a" are treated the same way).

Using Comments

Comments are any text enclosed in braces, for example, {}.Using comments makes expressions easier to read.

Using Spacing

Blank spaces within expressions are optional. However, the prudent use of spaces can make expressions in the Editor easier to read.

Using Clipboard Commands

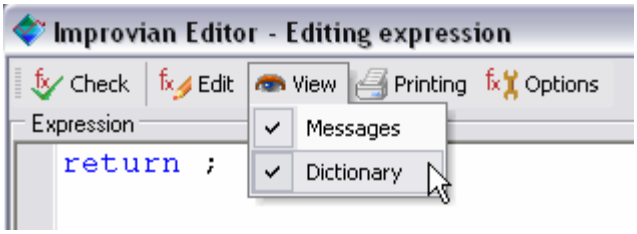
You can use the standard clipboard commands while editing expressions. To copy the highlighted text, press **CTRL+C**; to cut, press **CTRL+X**. To paste, press **CTRL+V**.
From the **Edit** menu you can access **Undo & Redo**, **Cut & Paste**, **Clear**, **Select All** commands.

Customizing the View

You can select whether or not to use the Dictionary and Messages sections in Improvian Editor.

To display/close the Dictionary and Messages sections:

1. To do this, on the toolbar, click **View** and select/clear **Dictionary** and/or **Messages**.



Printing

You can easily print a trading technique from **Improvian Editor**.

To print a trading technique:

1. In Improvian Editor, you can click **Printing.**

2. Click the **Setup Printer** to display the **Printing** tab**.**

3. Set margins, Word Wrap, Line Number and select a printer, as appropriate.

Note*: The Print Preview tab allows you to preview the print area.*
To configure, go to ***Tools>Improvian options>Printing****.*

Font, Background and Foreground

In the *Editor* tab of the *Preferences* dialog box, you can select a font style and size, background and foreground for the Improvian Editor.

Referencing Price Data of Other Symbols

The **External Function** capability allows obtaining the value of an expression (first parameter) based on the price data of another stock (second parameter). A special function enables a formula to obtain the price data of another symbol. The symbol(s) are referenced with a symbol defined in Data Manager.

For example, to obtain IBM's Close, you need to use the following syntax:

Return
External("Close", "IBM");

Additionally, you can calculate any indicator and even any numerical expression using the price data of a specified symbol.

***Note**: The External function does not work with weekly data.*

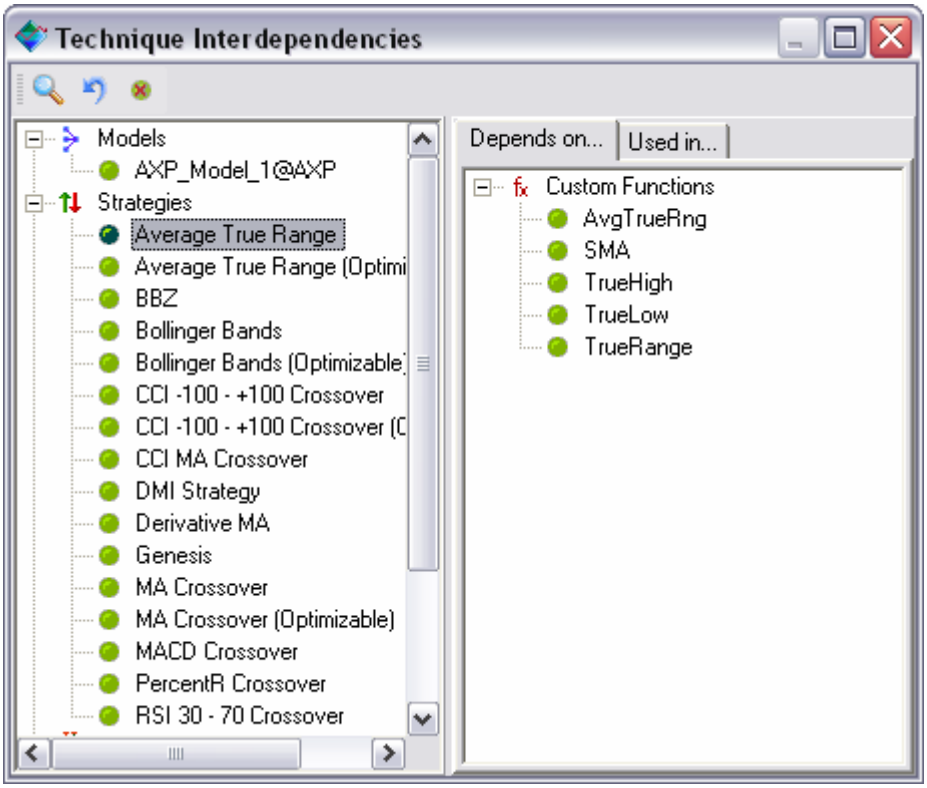
Technique Interdependencies

Technique Interdependencies is a special dialog box for reviewing all trading techniques available in Tradecision. It enables analyzing dependencies between techniques and editing them.

Reviewing Technique Interdependencies

To review technique dependencies:

1. From the **Tools** menu, select **Technique Interdependencies**.
2. In the *Technique Interdependencies* dialog box, select the **Model**, **Strategy**, or any other required technique.



3. Review the dependencies that are of interest to you by selecting the *Depends On* and *Used In* tabs.

You can also use the following toolbar buttons:

- Locate in the list – to locate the required technique on the list.
- Select previous techniques – to select a previous technique or techniques.
- Show only invalid techniques – to display invalid techniques.

Builders – special program modules that allow you to create and manage trading techniques in Tradecision. All these modules have separate dialog boxes. It means that you cannot access a strategy or indicator, say, from Study Builder.

Comments –text blocks that can contain some explanatory information for a specific trading technique. Syntax: {explanatory information}.

Dimension list – a list of dimensionality used by an array. Syntax: a[3,3]

Expression – an expression is any combination of reserved words and operators that represent a value.

Formula – is a logical arrangement of one or more functions, operators, data arrays, and so on.

For example: Average True Range strategy:

*return CLOSE\0\ > (OPEN\0\ + (0.5 * AVGTRUERNG(14)));*

Function Builder – a special tool that allows creating and managing user functions.

Function Parameter - a value (enclosed in parentheses) that can be given to a function. Parameters provide the information required to calculate the function value. The parameters that can be given to a function are explained in the description of the function.

Name (Identifier) – the name of a function. It can be no longer than 1000 symbols, including letters of the Roman alphabet, numeric characters and underscore. It is incorrect to start an identifier with a digit.

Previous values – Variable value of the previous step. Syntax: a\1\.

Reference – a reference to a variable or array used in a function declaration.

Return statement – Instruction of return. It stops program execution and returns a value.

Syntax - a set of rules, defining how to compose sentences using the Improvian language and its words. Syntax allows determining how to write formulas based on functions and operators.

Semantics - the branch of linguistics which studies meaning in human language, including the relationship between the language, thought, and behavior.

Statements - an Improvian statement represents a complete instruction. Statements can contain reserved words, operators, and punctuation marks, and they always end in a semicolon.

```
if Length >0 then
    Average:=Sum_ / Length;
else
    Average:=0;
```

Technique Validity – A trading technique can be valid or invalid. A technique is valid if it can be executed correctly. A technique is invalid when it uses another technique that cannot be called for one of the following reasons:

- absence of the technique (it was permanently deleted);
- the parameters of the technique have been changed.

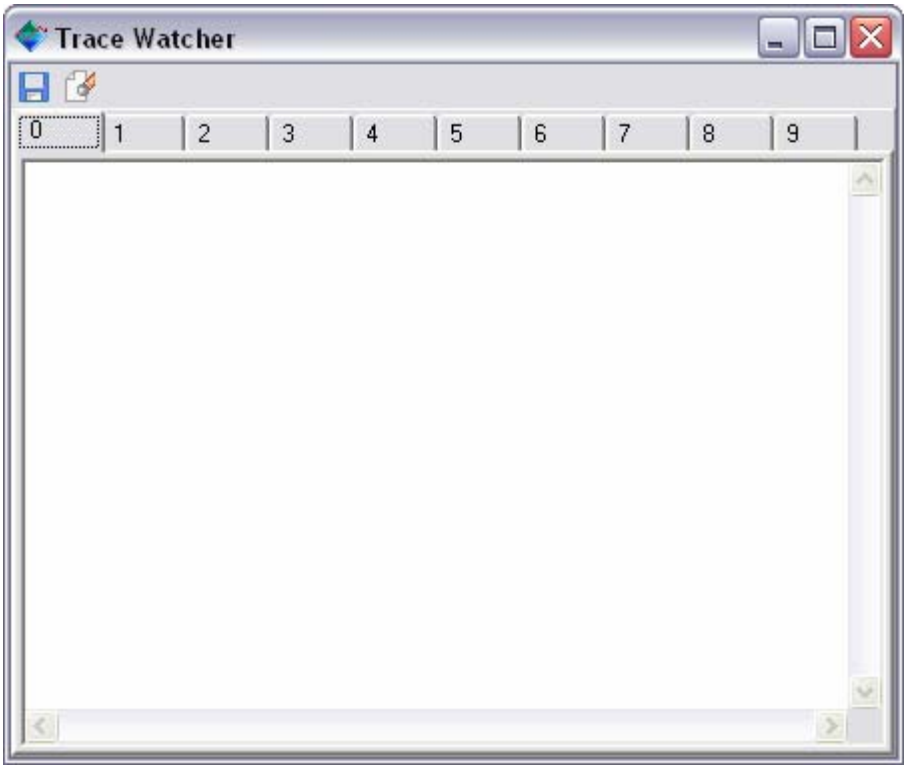
Trading Technique – a trading strategy, alert, scan, study or indicator that you want to create and/or use in Tradecision.

Trace Watcher

Understanding Trace Watcher

Trace Watcher enables analyzing the intermediate values of a trading technique to avoid making mistakes in your code. For example, you want to copy an indicator from the Technical Analysis of Stocks & Commodities magazine. The expression is pretty complicated, so there is a possibility of making a mistake. After some midway function you can write "println" and then you can analyze the results using Trace Watcher.

Trace Watcher contains 10 tabs (from 0 to 9), allowing you to send different pieces of information to different tabs.



To analyze the intermediate values of a trading technique in Trace Watcher:

1. Open **Improvian Editor**.
2. Insert "**println**" into your trading technique to indicate that you want to send some information to Trace Watcher. For example, **println(1,SumXAvg)**;
3. Save the trading technique.
4. Insert the trading technique into a chart.
5. Open **Trace Watcher** to see the results.
6. Select a tab.
7. Click **Clear** to clear the tab.
8. Click **Save to File** if you want to save the data in a separate text file.

   For example, writing the Mass Index function:

```
function  (Length1:numeric, Length2:numeric):numeric;
var
   SumXAvg:=0;
   SmoothXAvg:=0;
   em := EMA(Range, Length1);
end_var

SumXAvg := CumSum(em, Length2);
SmoothXAvg := EMA(em, Length2);
{Let's see intermediate values}
println(0,em);
println(1,SumXAvg);
println(2,SmoothXAvg);

If SmoothXAvg <> 0 Then
     return  SumXAvg / SmoothXAvg;

return 0;
```

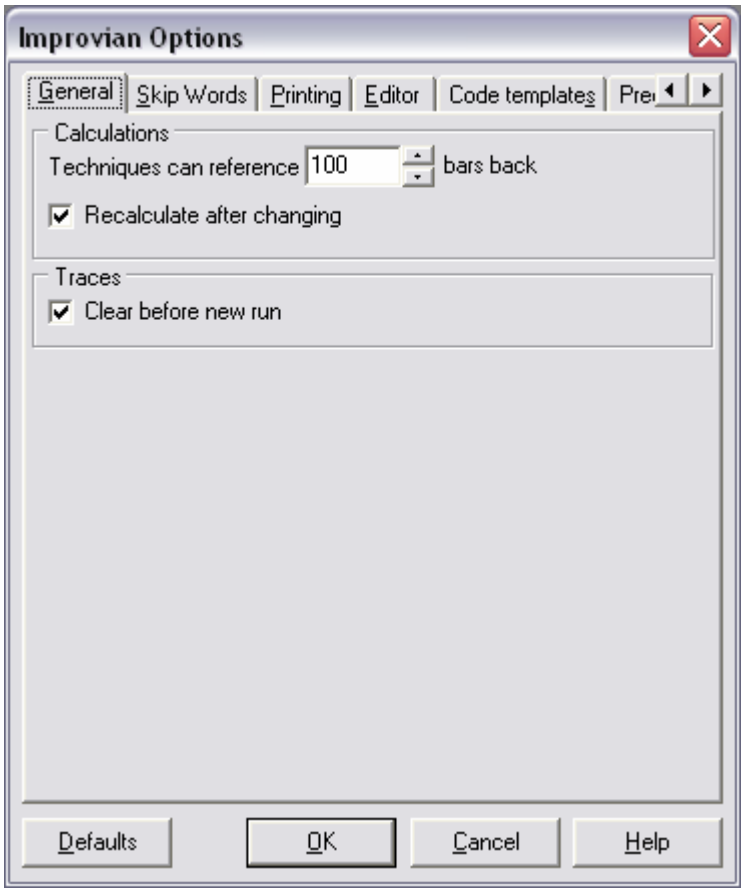
Improvian Options

The Improvian Options is used for managing system settings related to the Improvian language, used by the Tradecision application.

To open the Improvian Options dialog box:

1. From the **Tools** menu, click **Improvian Options**.

General Tab



Calculations

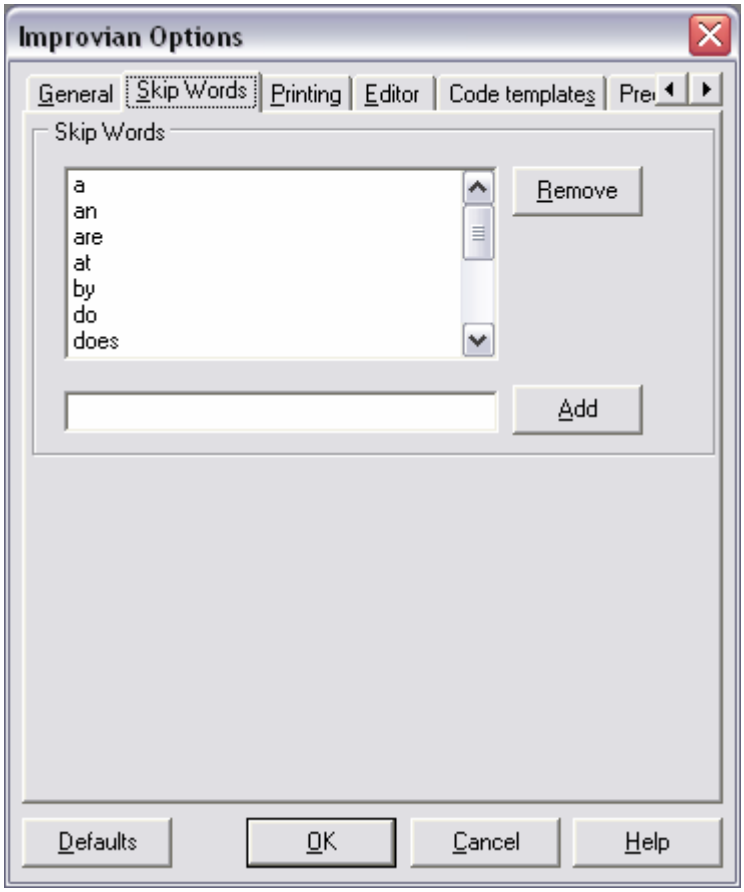
In the **Calculations** area, you can define how many bars backwards your trading techniques can reference.

Traces

Selecting the **Clear before run check-box** enables automatic clearing of the information on the results of the previous teachique's work in the *Trace Watcher* window for all the techniques that will be used by you.

Skip Words Tab

In Improvian, words that have no meaning are known as skip words. The application allows you to create a library of skip words that can be used when you are creating trading techniques. Skip words can be used to make syntax read more like English because Improvian Editor ignores them while verifying your trading techniques. Skip words are considered to be a kind of reserved words.



Adding a Skip Word

To add a skip word:

1. From the **Tools** menu, select **Improvian Options**.

2. In the *Improvian Options* box, select the *Skip Words* tab.

3. In the box next to the **Add** button, enter a skip word and then click **Add**.

The word will be added to the **Skip Word** list.

4. Click **OK**.

Removing a Skip Word

To remove a skip word:

1. From the **Tools** menu, select **Improvian Options**.

2. In the *Improvian Options* dialog box, select the *Skip Words* tab.

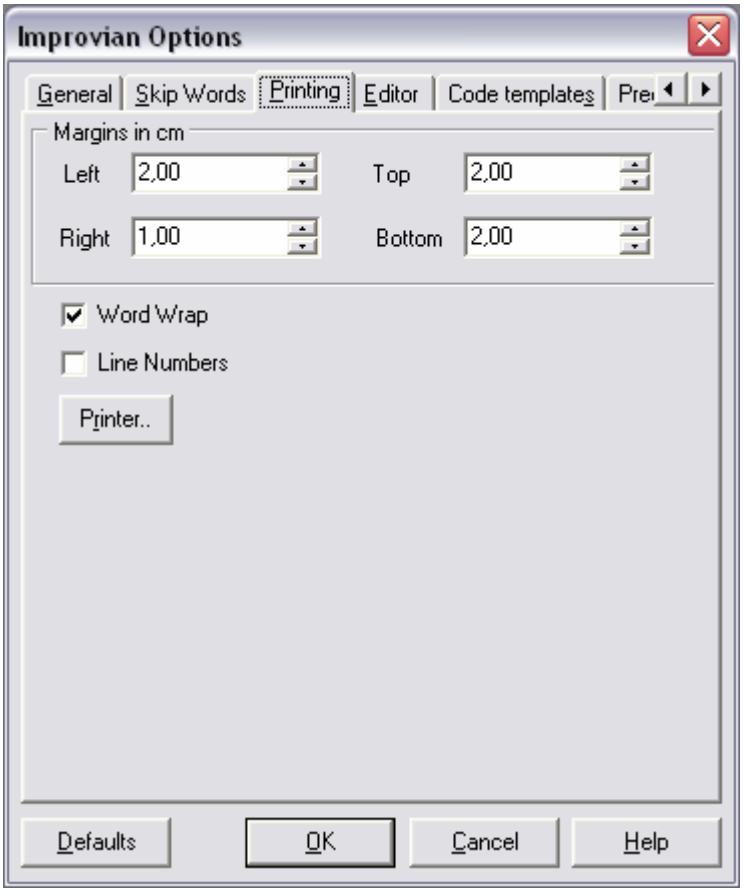
3. In the **Skip Word** list select the skip word that you want to delete.

4. Click **Remove**.

5. Click **OK**.

Printing Tab

You can easily print a trading technique from Improvian Editor.



To print a trading technique code from Improvian Editor:

1. In Improvian Editor, click **Printing** and then select **Print** if you want to send the printout directly to the printer,

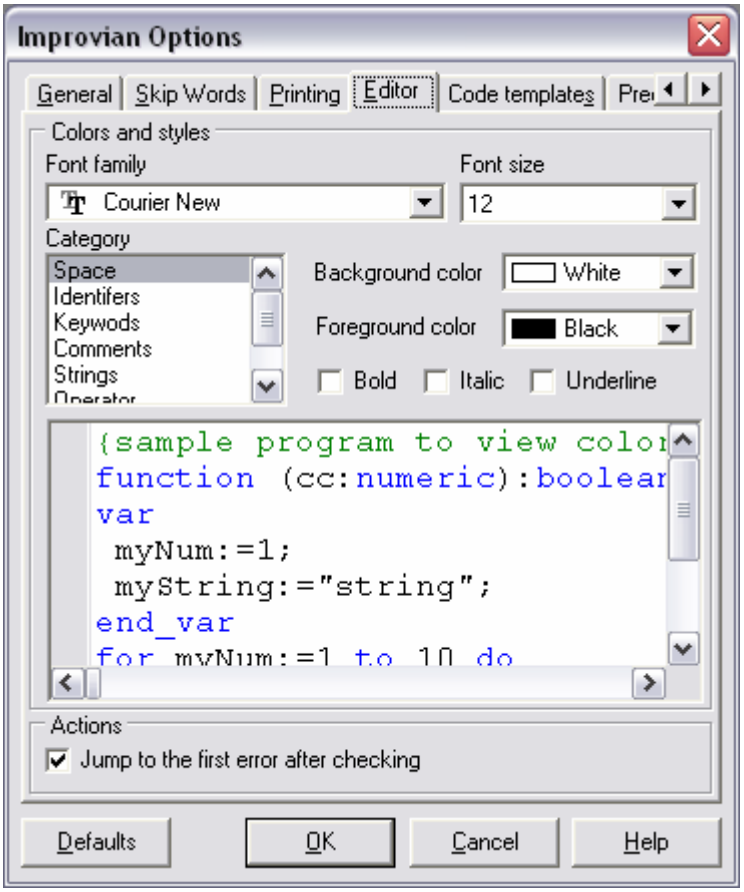
–OR–

Click **Setup Printer** or **Print Preview** if you want to preview the printout.

Note: *The printing parameters can be set in the Printing tab. To set the parameters, open the Printing tab and e click* ***Setup Printer.*** *Here you can set margins, Word Wrap, Line Number and select a printer.*

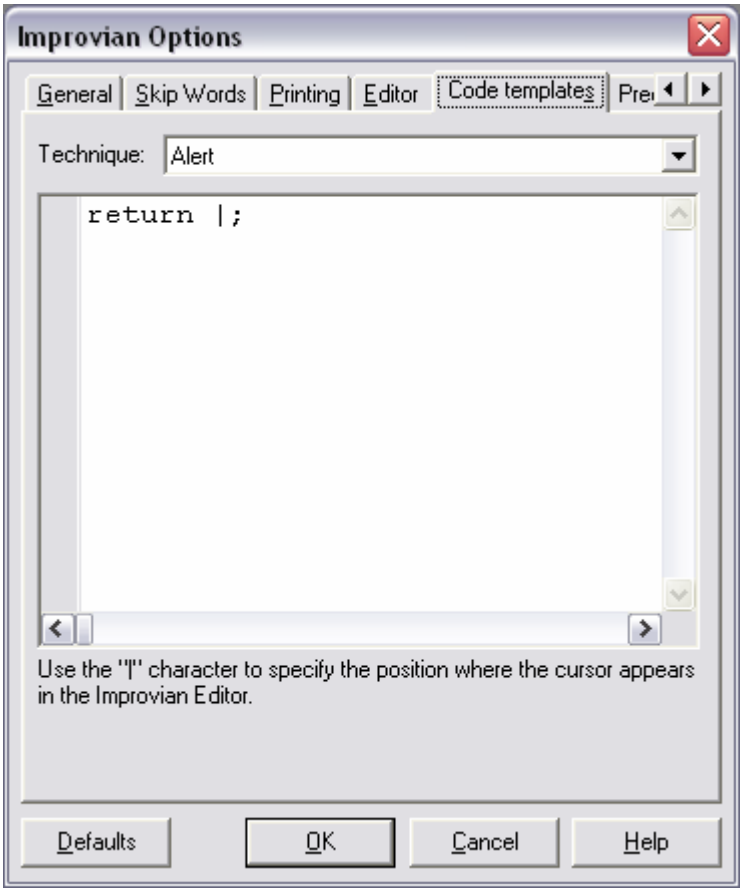
Editor Tab

The **Editor** tab you can select the font style, size, background and foreground for Improvian Editor.



Code Templates Tab

In the **Code templates** tab, you can define a template of Improvian code for corresponding Builder. By default return |; is selected.



***Note**: Use the | character to specify where the cursor will appear in Improvian Editor.*

To define a template for a trading technique:

1. From the **Tools** menu, select **Improvian Options**.

   The *Improvian Options* dialog box will be displayed.

   2. Select the *Code templates* tab.

   3. In the technique list, select a technique (indicator, alert, and so on) to which you want to apply the template.

   4. Click **OK**.

Predefined Variables Tab

From the **Tools** menu, select **Improvian Options** and then select the **Predefined Variables** tab.

Adding a Predefined Variable

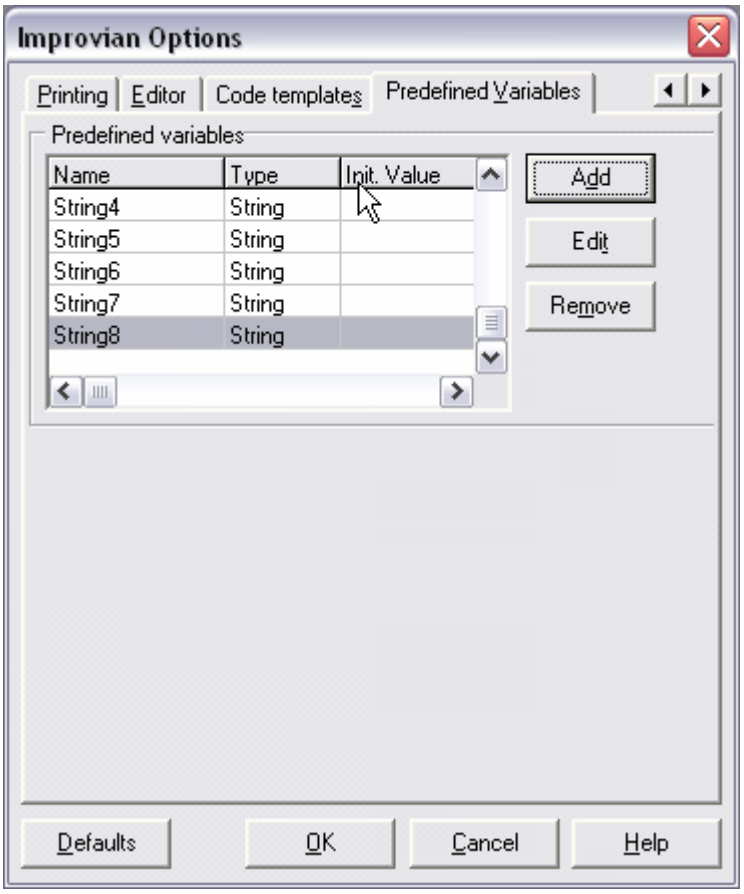
To add a predefined variable:

1. From the Tradecision **Tools** menu, select **Improvian Options**.

The *Improvian Options* window is displayed.

2. In the *Improvian Options* window, select the *Predefined Variables* tab.

The *Predefined Variables* tab is displayed.



3. In the *Predefined Variables* tab, click **Add**.

The *Add Predefined Variable* dialog box is displayed.

4. In the *Add Predefined Variable* dialog box, provide the following information:

- **Name**. Enter the name of the variable being added.
- **Type**. The type of the variable being added. Select from the list.
- **Init. Value**. Enter an initial value.

5. Click **OK**.

The new variable will be added to the list of the existing predefined variables.

Editing a Predefined Variable

To editing a predefined variable:

1. From the Tradecision **Tools** menu, select Improvian Options.

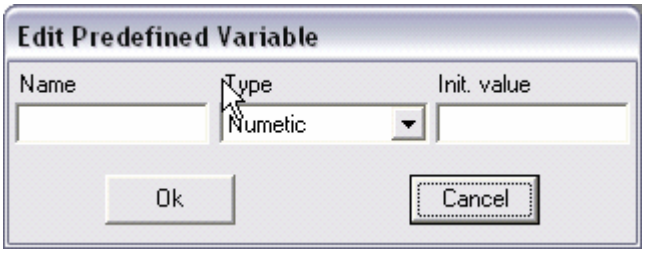
The *Improvian Options* window is displayed.

2. In the *Improvian Options* window, select the *Predefined Variables* tab.

The *Predefined Variables* tab is displayed.

3. In the *Predefined Variables* tab, click **Edit**.

The *Edit Predefined Variable* dialog box is displayed.



4. In the *Edit Predefined Variable* dialog box, modify the following information as appropriate:

- **Name**. Enter the name of the variable being added.
- **Type**. The type of the variable being added. Select from the list. The following options are available:
  - **Numeric**
  - **Boolean**
  - **String**
- **Init. Value**. Enter an initial value.

5. Click **OK**.

Deeleting a Predefind Variable

To delete a predefined variable:

1. From the Tradecision **Tools** menu, select **Improvian Options**.

The *Improvian Options* window is displayed.

2. In the *Improvian Options* window, select the *Predefined Variables* tab.

The *Predefined Variables* tab is displayed.

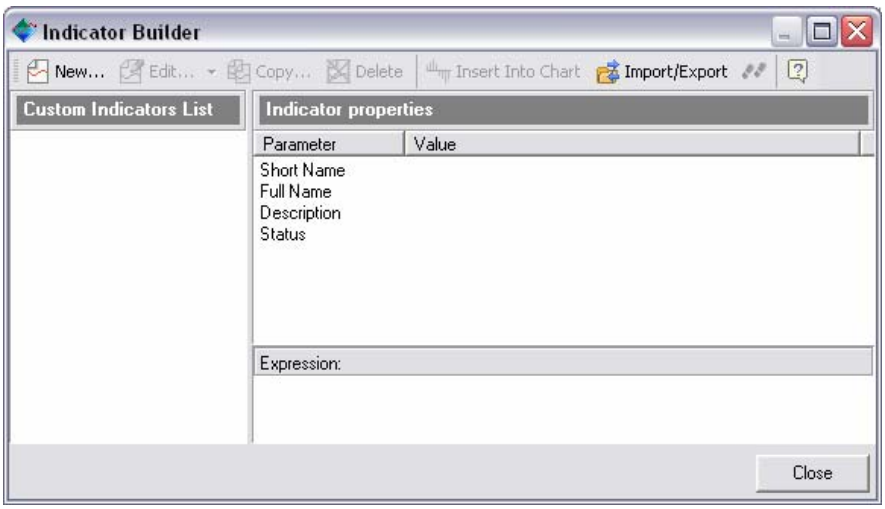
3. From the list of the predefined variables in the **Predefined Variables** section of the tab, select the variable that you want deleted and click **Remove**.

Chapter 11

Indicator Builder

You can create the custom indicators using Indicator Builder.

Note: *This Indicator Builder tool is available only in Tradecision Professional and Professional Real Time.*



Understanding Custom Indicators

Along with a standard set of indicators, Tradecision provides functionality for creating and improving your own custom indicators. Since the trading technologies and technical analysis are constantly developing, it is very helpful to use this tool for experimenting and creating up-to-date advanced indicators.

A custom indicator can be a combination of other indicators. Some well-known indicators are simply a combination of other indicators. For instance, Chaikin Oscillator is a subtraction of a 10-period EMA of Accumulation-Distribution from a 3-period EMA of Accumulation-Distribution, and TRIX is a combination of 3 Exponential Moving Averages.

You can create or edit your own custom indicators using **Indicator Builder**.

All indicators are automatically stored by Tradesicion so that you do not have to re-enter them every time you want to use the formula.

Formulas created using Indicator Builder, as well as formulas used to calculate the built-in indicators (for example, Stochastics, RSI, and so on) are completely independent of each other. Any changes made to the custom indicators will not affect the predefined indicators.

Creating a Custom Indicator

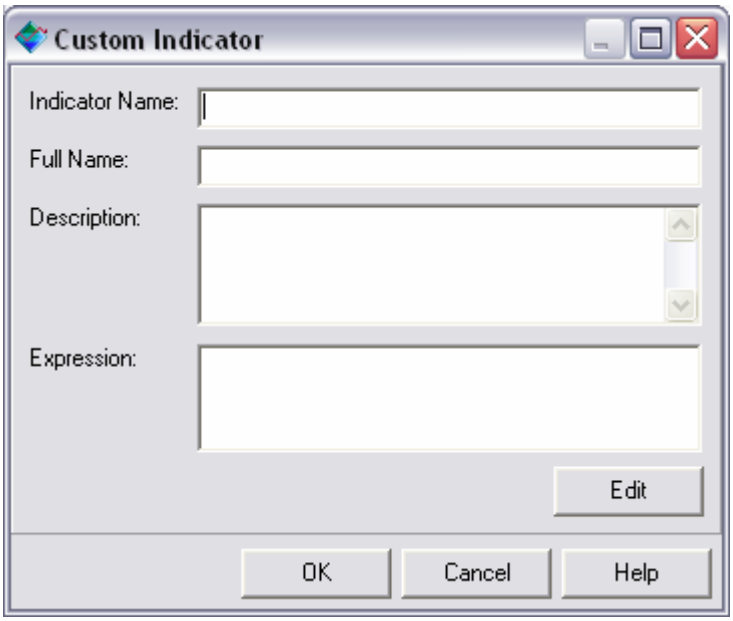
To create a new custom indicator:

1. From the **Tools** menu, select **Indicator Builder**.

The *Indicator Builder* dialog window will be displayed

2. In the *Indicator Builder* dialog box, click **New**.

The *Custom indicator* dialog box will be displayed.



3. In the *Custom indicator* dialog box, enter the following data in the corresponding boxes:

- **Indicator Name;**
- **Full Name;**
- **Description.**

4. To define the indicator formula, click the **Edit** button under the **Expression** box.

Improvian Editor will be displayed.

5. In the **Expression** box of the *Improvian Editor* dialog box, you enter the actual formula for your indicator and click **OK**..

6. Click **OK** to save the newly created custom indicator.

Modifying a Custom Indicator

To edit a custom indicator:

1. From the **Tools** menu, select **Indicator Builder**.

The *Indicator Builder* dialog box will be displayed.

2. In the **Indicator Builder** dialog box, click the **Edit** button.

The *Custom indicator* dialog box will be displayed.

3. In the *Custom indicator* dialog box, edit the **Full Name** and/or **Description** as appropriate.

4. To define the indicator formula, click the **Edit** button under the **Expression** box.

The *Improvian Editor* window will be displayed.

5. In the **Expression** box of the *Improvian Editor* dialog box, you can edit your indicator formula.

6. Click **OK** to save the changes.

Copying a Custom Indicator

You can make a copy of the selected custom indicator in the *Custom Indicator* dialog box using the **Copy button**.

This feature is useful when you want to design a new custom indicator that is very similar to another indicator.

To copy a custom indicator:

1. From the **Tools** menu, click **Indicator Builder**.

The *Indicator Builder* dialog box will be displayed

2. From the **Custom Indicator List** in the *Indicator Builder* dialog box, select an indicator that you want to copy.

3. Click the **Copy** button**.**

All the indicator data will be copied and the *Custom Indicator* dialog box will be displayed.

4. Make changes in the Indicator Name, Full Name, Description and Expression boxes, as appropriate.

Note: *Step 4 of this procedure is optional.*

5. Click **OK**.

Deleting a Custom Indicator

You can delete custom indicators from the *Indicator Builder dialog* box using the **Delete** button.

To delete a custom indicator:

1. From the **Tools** menu, select **Indicator Builder**.
2. From the **Custom Indicator List** of the *Indicator Builder* dialog box, select the indicator that you want to delete.
3. Click **Delete**.

Import/Export

With the easy-to-use **Import/Export** tools, you can manage you trading ideas more effectively.
Custom indicators, trading systems, studies and models that you created and saved on your local hard drive can be easily imported, exported and sent by email.

Importing Indicators

To import indicators:

1. In the *Indicator Builder* dialog box, click **Import/Export** and then select **Import Indicators**.

2. From the *Import – Indicators* dialog box, click the button to browse for the folder from which you want to import the indicators on your local hard drive.

3. Select the indicators that you want to import by selecting the corresponding check boxes.

4. Click **Import**.

All imported indicators will be added to your Indicator List.

5. Click **Close** to close the *Import – Indicators* dialog box.

To export indicators:

1. From the *Indicator Builder* dialog box, click **Import/Export** and then select **Export Indicators**.

2. In the *Export – Indicators* dialog box, click the **Browse** button to browse for the folder to which you want to export the indicators on your local hard drive.

3. Select the indicators that you want to export by selecting the corresponding check boxes.

4. Click **Export**.

   The indicators will be saved in a folder you indicated with the extension.**tnd**. Now you can send them to your friends or partners by e-mail. The receiver will need to use the **Import** command to be able to work with the indicators

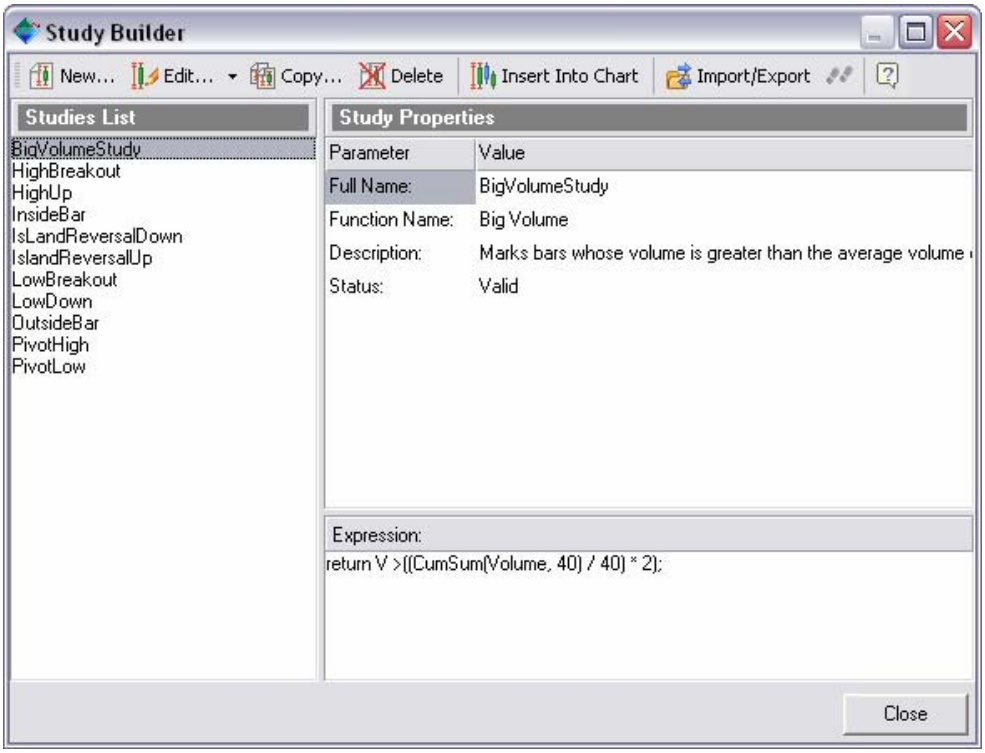
5. Click **Close** to close the *Export – Indicator* dialog box.

Chapter 12

Study Builder

With Study Builder, you have the opportunity to create, save and load your custom studies into a chart.

***Note**: This Study Builder tool is available only in Tradecision Professional and Professional Real Time.*



Understanding Study Builder

Study Builder is an analysis tool that enables you to improve your trading by creating a variety of custom studies.

With Study Builder, you have the opportunity to create custom studies using your own trading ideas that can be easily stated and further developed using the Improvian Language. Your custom studies can then be saved and loaded into a chart.

With Study Builder you will be able to mark a particular market activity and/or specific chart pattern with colored markers plotted over a chart. This enables you to follow the recurrence and consequences of those market conditions that you want to note.

As soon as it is added to the Studies List, a study becomes part of your study collection, and you can easily edit it and apply it to any chart.

The number of diverse studies you can build is virtually unlimited, so you can build as many as you can come up with.

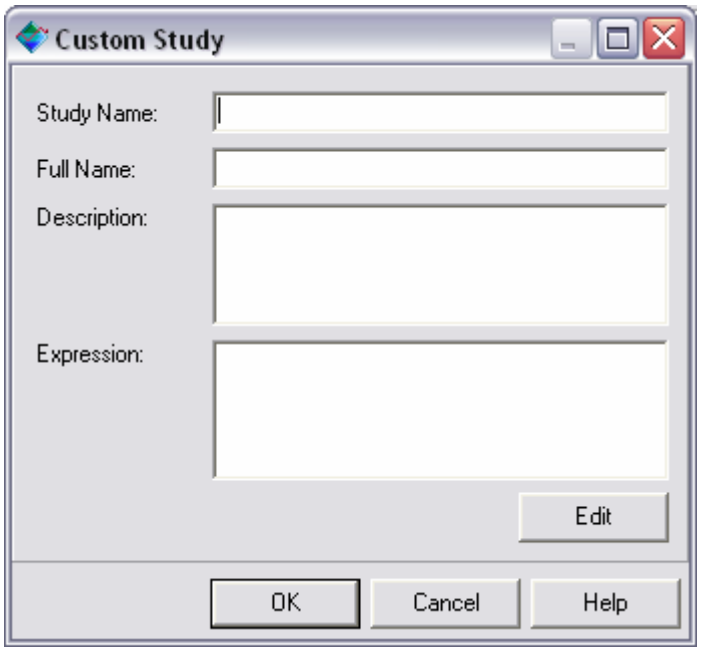
Creating a Custom Study

To create a new custom study:

1. From the **Tools** menu, click **Study Builder**.

The *Study Builder* dialog box will be displayed.

2. In the *Study Builder* dialog box, click **New** to add a new custom study to your library.



3. In the *Custom Study* dialog box, enter the name and description of the study being created in the **Name** and **Description** boxes.

4. Click **Edit** to write and check the study formula in the *Improvian Editor* dialog box.

5. Click **Insert**.

   The custom formula will be added to the **Expression** text box of the **Custom Study** dialog box.

6. Click **OK**.

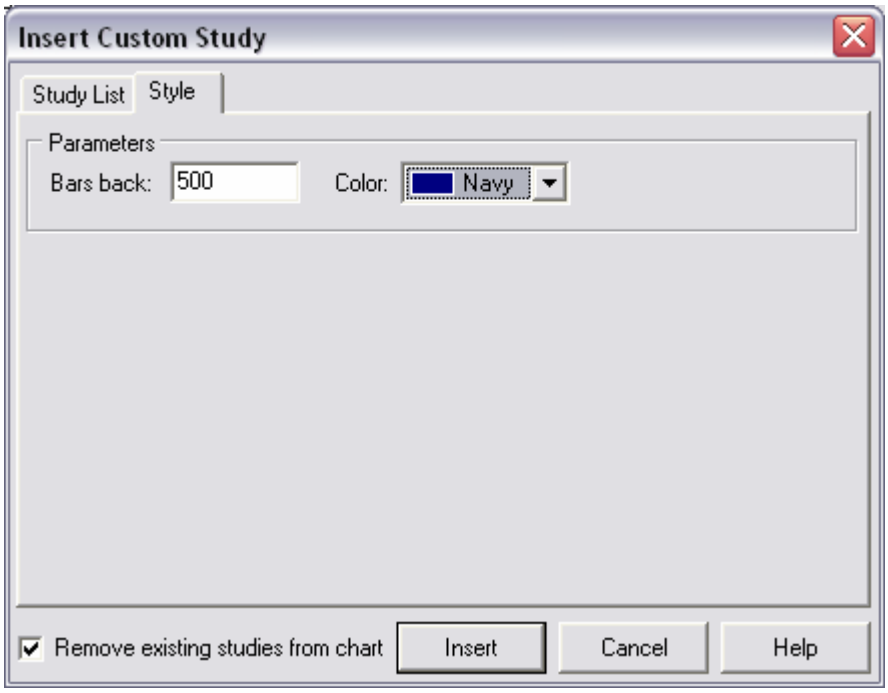
   The newly created study will appear in the **Studies List** area.

To change the color and bars back of a custom study:

1. From the **Tools** menu, select **Study Builder**.
2. In the **Studies List** area, select the study that you want to modify.
3. Click the **Insert Into Chart** button.

The *Insert Custom Study* dialog will be displated

4. Select the **Style** tab. In the **Parameters** area, change the bars back value and select a new color from the list.



5. Click **Insert**.

Editing a Custom Study

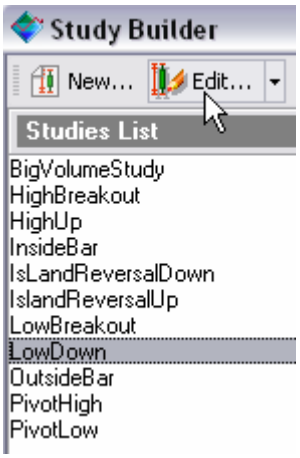
To edit a custom study:

1. From the **Tools** menu, select **Study Builder.**

The *Study Builder* dialog box will be displayed.

2. In the **Studies List** area, select the study that you want to modify.

3. Click the **Edit** button.



4. In the *Custom Study* dialog box, make the required changes.

5. Click **Edit** to edit and check the study formula in the *Improvian Editor* dialog box.

6. Click **OK**.

Copying a Custom Study

You can make a copy of a selected custom study in the *Study Builder* dialog box using the **Copy** button. This is useful when you want to design a new custom study that is very similar to another custom study.

To copy a custom study:

1. From the **Tools** menu, select **Study Builder.**

The *Study Builder* dialog box will be displayed.

2. In the **Studies List** area, select the study that you want to copy and then click **Copy**.

3. In the **Name** box of the *Custom Study* dialog box, enter the new name of the study.

4. Click **OK** to save the changes.

The new custom study will appear in the **Studies List** area.

Deleting a Custom Study

You can delete a selected custom study from the *Custom Studies* dialog box using the **Delete** button.

To delete a custom study:

1. From the **Tools** menu, select **Study Builder**.

   The **Study Builder** dialog box will be displayed.

2. In the **Studies List** area, select the study that you want to delete.

3. On the toolbar, click **Delete**.

Inserting a Custom Study into a Chart

You can display the signals generated by **Study Builder** in the corresponding chart.

To insert a custom study into a chart:

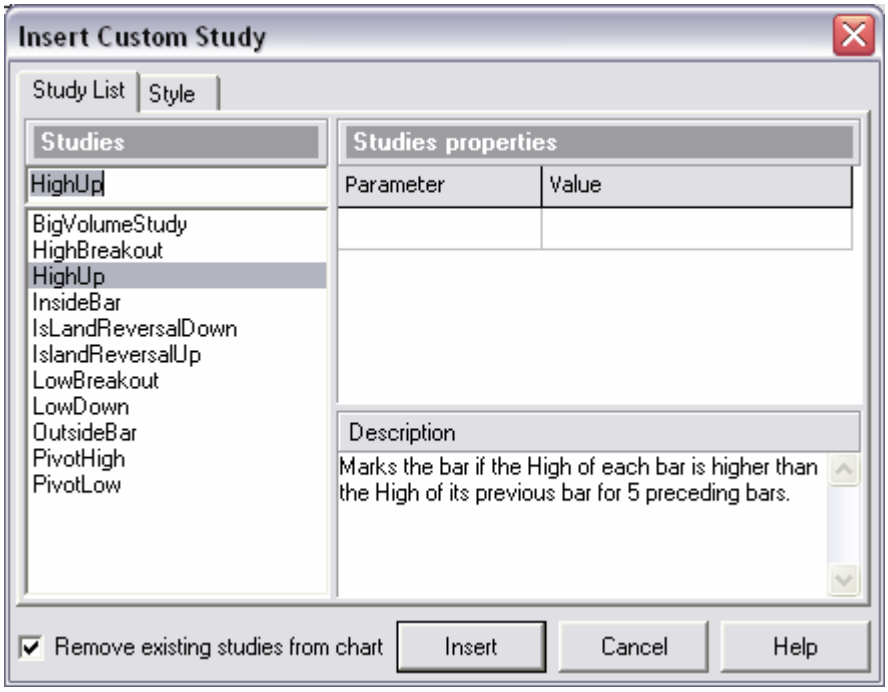
1. From the **Tools** menu, select **Study Builder**.

The *Study Builder* dialog box will be displayed.

2. From the **Studies List** area, select the study that you want to insert into a chart.

3. On the toolbar, click **Insert Into chart**.

4. From the *Intert Custom Study* dialog, select the study you want to insert.



5. Click **Insert.**

The selected custom study will be calculated and inserted into the corresponding chart.

Import/Export

With Tradecision's easy-to-use **Import/Export** tools, you can manage your trading ideas more effectively. You can easily exchange any of your trading ideas with your friends.

The custom indicators, trading systems, studies and models that you created and saved on your local hard drive can be easily imported, exported and sent by email.

Importing Custom Studies

To import Custom Studies:

1. In the *Study Builder* dialog box, click **Import/Export**, and then select **Import Studies**.

The *Import – Custom Studies* dialog box will be displayed.

2. In the *Import – Custom Studies* dialog box, click the **Browse** button to select the folder you want to import the studies from on your local hard drive.

3. Choose the studies that you want to import by selecting the corresponding check boxes.

4. Click **Import**.

All the imported studies will be added to your **Custom Studies List**.

5. To close the *Import – Custom Studies* dialog box, click **Close**.

To export custom studies:

1. In the *Study Builder* dialog box, click **Import/Export**, and then select **Export Studies**.

2. In the **Export – Studies** dialog box, click the **Browse** button to select the folder on your local hard drive where you want to export the studies.

3. Choose the studies that you want to export by selecting the corresponding check boxes.

4. Click **Export**.

   The studies will be saved in the selected folder with the extension .**tdf**. Now you can send them by email to your friends or partners. The recipient will need to use the **Import** command to work with the studies.

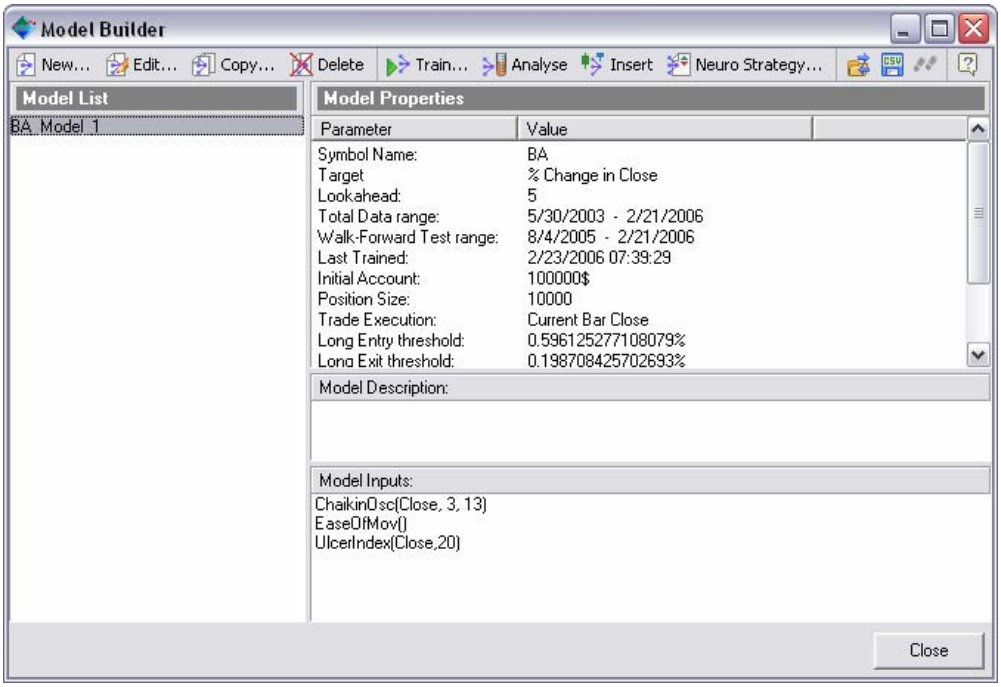
5. To close the *Export – Studies* dialog box, click **Close**.

Chapter 13

Neural Model Builder

The Tradecision functionality enables modeling security prices using neural networks.

A neural network trained for a certain security can be used to generate a trading strategy based on model forecasts. This neuro-strategy can be tested, optimized and used to generate buy/sell signals.



Understanding Neural Models

Tradecision uses very adaptable and precise constructive neural networks to create neural models. Constructive nets grow and train themselves during iterative price movement analysis.

Network construction, training, testing and parameters selection are fully automated. All the scientific details are hidden. You do not have to have any knowledge of neural networks to successfully create and train a neural network.

Tradecision requires a set of input columns and a target column to create and train a model. A trained model can be used with the current values of the inputs to forecast what the closing price (or some other price/indicator) will be in the future. Model forecasts can then be used to create a trading strategy, generate buy/sell signals, back- and forward-test the model's performance.

Prevention of over-optimization is automatically maintained using Alyuda's special algorithms, which, just like many other algorithms used in the application's functionality, were developed as a result of years of AI applications' research in trading and financial forecasting.

Introduction to Genetic Algorithms

Genetic Algorithms are search algorithms based on the mechanics of natural selection and natural genetics. They combine the survival of the fittest rule with a structured yet randomized information exchange. The method uses terms accepted in genetics, such as fitness, population, generation, mutation, gene, and so on.

In contrast to random search methods (such as, for example, Monte Carlo) genetic algorithms are not a simple random walk. These algorithms efficiently use historical information to speculate on new search points with expected improved performance. Their goal is forming or finding a population of trading strategies that will have the best fitness level, or in other words, the best optimization criteria values.

Genetic algorithms possess the best characteristics of the other optimization methods, such as robustness and fast convergence, which does not depend on any of the optimization criteria (for instance, on smoothness).

Although genetic algorithms are much faster while searching a large number of possible options, they are slower than exhaustive search as far as a small search space is concerned.

Introduction to Neural Networks

Over recent decades, neural networks have become widely adopted for financial analysis due to their ability to solve tasks that are difficult or impossible to solve using other, conventional methods.

Neural networks are indispensable for those tasks, where problems are difficult to solve using clear logic or mathematical dependencies.

Using neural networks you can expose and use hidden patterns of a high degree of complexity by analyzing the actual historical data.

General Information

Neural networks have a number of properties that distinguish them from other methods.

Firstly, being able to memorize information, they also have the ability to generalize it. That means that a well-trained network is capable of working successfully not only with the data it has memorized, but also with data that was not used for training or is garbled.

Secondly, a neural network can train up, i.e. improve its characteristics every time new data arrives.

In addition, the Neural Networks can very quickly obtain answers from a previously trained network, which is highly important for real-time analysis.

Good neural models, provided they had the right amount of data and relevant inputs, forecast with **60-80% accuracy**.

What Are Neural Networks?

Neural networks are data analysis methods and algorithms loosely based on nervous systems of humans and animals.

An artificial neural network consists of a large number of simple processing units linked with weighted connections. By analogy, the processing units may be referred to as neurons. Each unit receives inputs from many other units and generates a single output. The output acts as an input for other processing units.

The power of a neural network stems from the combination of multiple units in a network. A certain network can be tuned to solve a specific problem by modyfing the connection topology and values of the connecting weights between its units.

Artificial neural network is nonlinear in nature and, thus, is an exceptionally powerful method of analyzing real-world data that allows modeling extremely difficult dependencies.

Neural networks have proven to be among the best methods of detecting hidden relations in stock market data. Once a neural network has analyzed your dataset (i.e. "has received training"), it is able to make predictions based on the hidden dependencies that have been found.

Biological Prototype

Artificial neural networks were created for conducting research into the way the human brain functions. During this research there was made an attempt to create a model that would incorporate the existing knowledge of the structure of the human brain and the patterns based on it functions.

During the model research, a number of useful features were discovered. As a result, there appeared a new direction in the development of neural networks, Neural networks started being developed to be applied in a variety of fields.

At the present time, it is exactly this direction that is developing most rapidly and is considered to be the most promising.

Artificial neural networks model the functioning of the human brain very simplistically. The basic ANN elements, called Artificial Neurons, model the functioning of brain cells.

The structure of a neural network and the laws of operation of artificial neurons are also similar to the original. However, the human brain contains dozens of billions of neurons and has a structure so complex that at this point it is impossible to understand, let alone to model it.

The structure of an artificial neuron is rather simple. It has a set of inputs, a body and an output. The neuron receives a set of signals at the input and transforms the signals by generating an output signal. The neuron inputs and outputs are linked with each other. As a result you can receive a set of signals at the output by sending a set of signals to the input. ANN training is the correction of links between the neurons in such a way that a very close similarity between the input and output data is achieved.

Preparing Data for Neural Networks

Data for feeding a network is usually presented in the tabular format. One or several columns are output columns and the rest are input columns.

ANNs work with numeric data. However, problematic data is seldom numeric. Often, dates and time, as well as textual data contained in the final set of values, have to be processed. Therefore, additional processing and transformation of such data are required before using the data as the network input and after the data output.

Prior to being fed to the network input, numeric data must be scaled, as artificial neurons have a limited range of operating values. Therefore, input information should be processed to fall within this range and output information should be received from network output by means of reverse transformation.

Using a Neural Network

The task of data forecasting is one of the main neural network applications. This process can be conditionally divided into two stages:

1. Preparing and training a network on source data;

2. Using a trained network to forecast new data.

The preparation of a neural network model is divided into several stages:

- **input dataset analysis:** data types definition (numerical, categorical, text, data/time, and so on), missing values and outliers handling, inputs selection and noise reduction;
- **data preprocessing:** transferring source data into a form suitable for a neural network;
- **network design:** selection of a network architecture, training method, training parameters;
- **network training;**
- **performance test of the trained network;**
- **network improvement based on test results.**

The network can be re-trained with other inputs, architecture, training method or training parameters.

Using a ready network is a less complicated and time-consuming process than its preparation. At the input, a set of data that was preprocessed based on the same principles and using the same methods as those during the first stage, is fed into the network and the output is unknown. After getting the input signal the network generates an output signal, which is the forecasting value after post-processing.

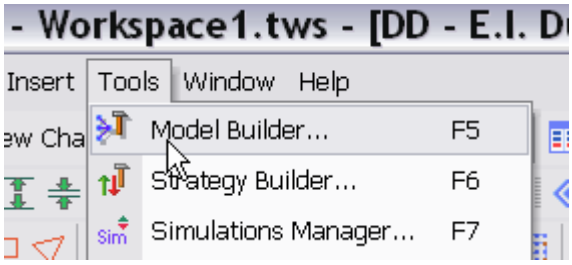
It should also be mentioned that, as a rule, network preparation and training require a significant amount of time. The quality of the result depends strongly on the training data selection, representation and preprocessing, as well as on the architecture and tuning of the training algorithm. In any case, the amount of training data must correspond to the complexity of the problem to be solved.

Creating a New Model

A new neural model can be easily created using the New Model wizard. The new model will analyze and forecast the symbol data of the current chart.

To start the New Model wizard:

1. From the **Tools** menu, select **Model Builder**.



The *Model Builder* will be displayed in a separate window.

2. On the Model Builder toolbar, click **New**.

   This command activates the New Model wizard, which guides you through the process of creating a neural model.

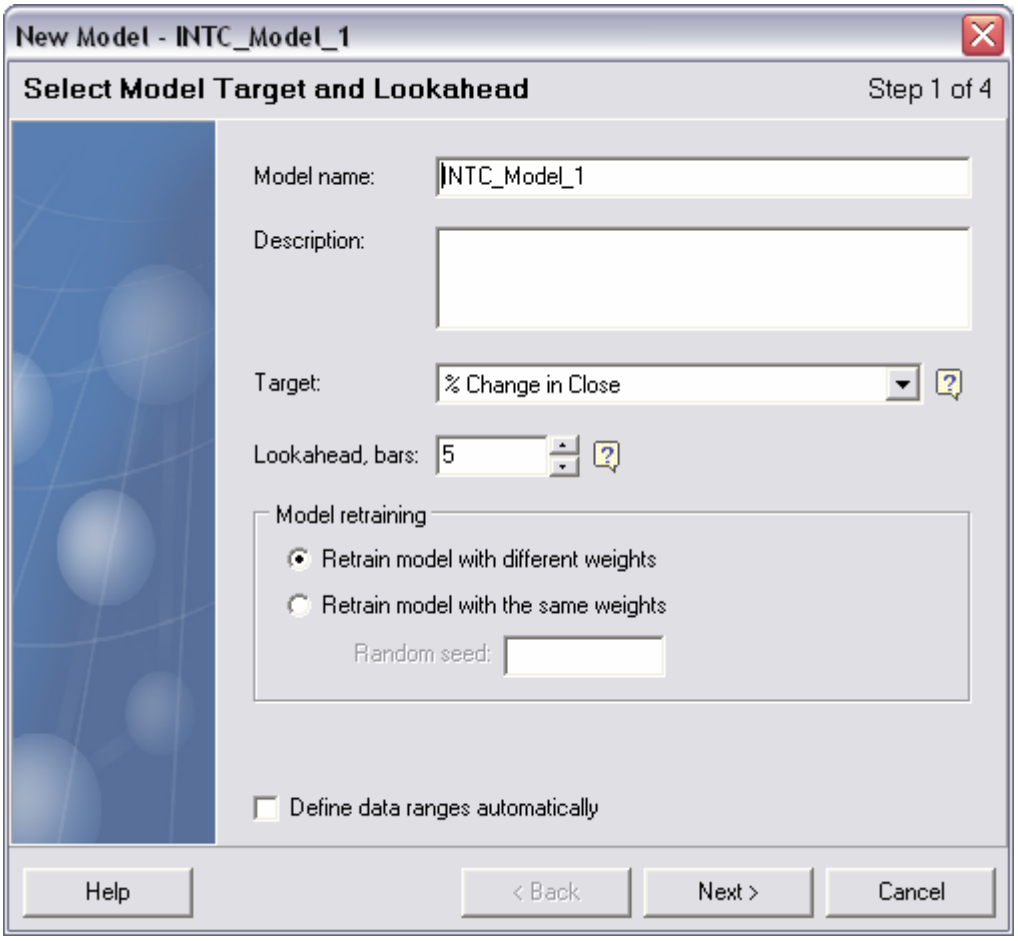
New Model Wizard

The New Model wizard guides you through the process of creating a neural network model used to forecast future price or indicator values.

The wizard comprises four steps:

Step 1: Select model target and lookahead;
Step 2: Select training and test data ranges;
Step 3: Select model inputs
Step 4: Define model-based strategy for performance report

Step 1: Select the Model Target and Lookahead



During this step, you need to define the model target and specify how far into the future you want the model to predict.

In the **Model name** box, you can change the automatically generated model name to a more descriptive one.

In the **Description** box, you can enter the model description that can help you distinguish this model from similar ones created for the same stock.

The **Target** list can be used to define which indicator should be considered as the target one. In other words, you need to define the data that must be predicted by the model. By default, **"% change in Close"** is selected as the model target. However, you can also select **change in Close**, **% change in Open** or **change in Open**.

In the **Lookahead** box, you can enter the number of bars for which you want the model to forecast.

The **Lookahead** parameter specifies how far into the future you would like to forecast. For example, if you are trying to predict a value two trading days in advance using daily price data, this value should be set to 2. The further into future you want to forecast, the bigger forecasting error you should expect. We recommend forecasting 1-10 bars ahead. However,

in many cases forecasting 4+ bars ahead could have a lower error than 1-3 bars ahead as natural noise is reduced as the time of the forecast increases.

You can select the **Define data ranges automatically** to skip Step 2. In this case data ranges used for model training and testing will be selected using the default settings. By default, 3000 bars will be used for model preparation, the last 20% being allocated for walk-forward testing.

Selecting Target

While creating a model, you need to select a market parameter (data column) which must be predicted by the model. This parameter is called target. You can choose to forecast **Close**, **Open** or any available technical indicator.

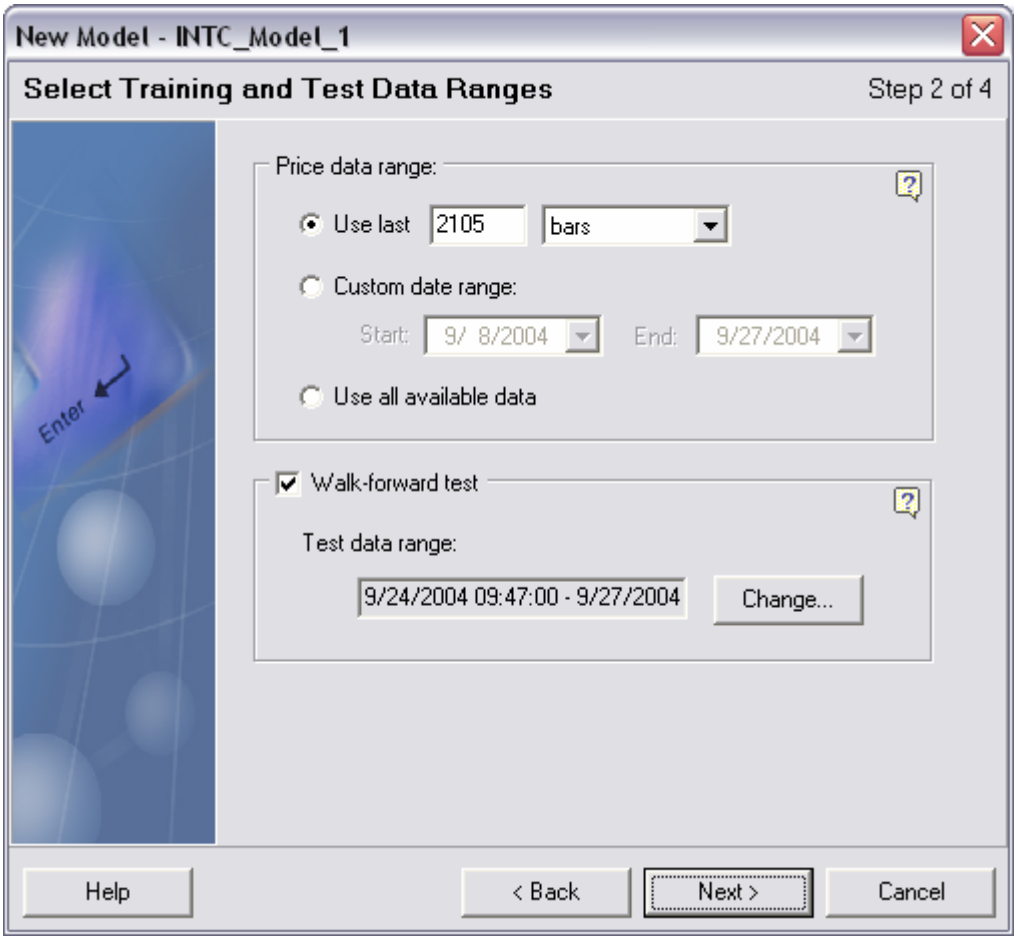
Tradecision always creates models that forecast change or percent change in order to normalize similar price patterns at different price levels. This simple approach can enhance the model performance several times. For some indicators, normalization is not necessary. However, even in this case, this approach can slightly improve the performance as, for example, a 10% model error converted into absolute values is less significant than a direct 10% error in the absolute values.

Tradecision does not provide any **High** or **Low**-forecasting functionality, as this data contains a great deal of noisy movements and outliers. Therefore, a model targeted to forecast **High** or **Low** will be rather inefficient.

Selecting an indicator as the target is helpful if you want to forecast market volatility, typical price, moving averages, price momentum or market strength. You can also create a composite indicator to use smoothed or de-trended representation of the market.

Price data and most of the indicators contain noise in their values. This is one of the reasons for models' poor performance. To reduce the amount of noise, you can use a moving average of **Open**, **Close** or an indicator as the model target. When your target is a moving average of price or that of an indicator, you should keep the **Period** parameter of the moving average lower than the model's **Lookahead** parameter.

Step 2: Select Training and Test Data Ranges



During this step, you need to define how much data will be used for the model preparation. You can also allocate manually the portion of this data that should be used for walk-forward testing.

To select the amount and position of the price data:

1. To define the duration of the test period, in the **Price data range** area, select the **Use last** option and enter the amount of data that you want to use.

   ***Note**: The system supports defining the duration of the testing period in bars, years, months or weeks.*

2. To precisely specify the start and the end date for the data used for the model preparation, select the **Custom date range** option.

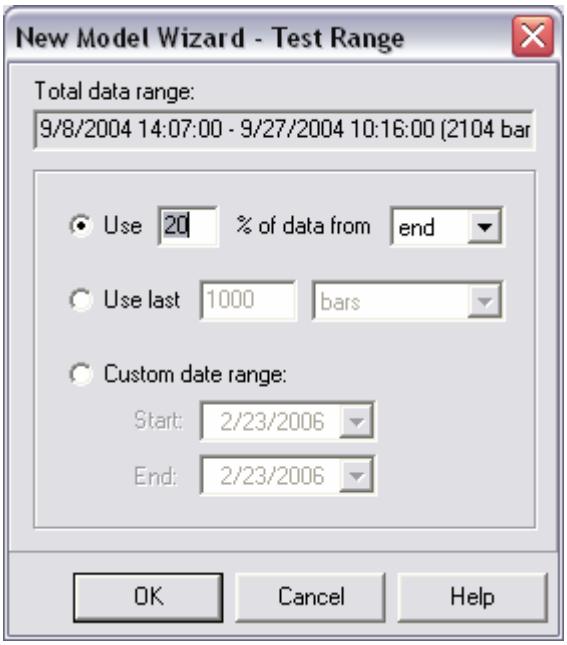
***Note**: This option is especially useful if you want to train or test the model on certain price patterns.*

3. Select the **Use all available data** to use all the data available for this security.

The data that will be used for walk-forward testing will be allocated automatically. The allocated range is displayed in the **Walk-forward test** area.

Although it is not recommended, you can skip the walk-forward testing by clearing the **Walk-forward test** check box.

To change the amount and position of the price data used for model walk-forward testing:



1. In the **Walk-forward test** area, click **Change**.

2. In the *Test Range dialog* box, select the **Use % of data from** option to specify the test period as a percentage of the data available for the model preparation. The specified amount can be allocated in the beginning or end of the available price data, depending on in which is selected by in the corresponding list.

2. To define the duration of the test period, in the **Price data range** area, select the **Use last** option and enter the amount of data that you want to use.

   ***Note**: The system supports defining the duration of the testing period in bars, years, months or weeks.*

3. To precisely specify the start and the end date for the data used for the model preparation, select the **Custom date range** option.

***Note**: This option is especially useful if you want to train or test the model on certain price patterns.*

4. Click **OK**.

   The walk-forward data range will be re-allocated.

Selecting Model Test Period

The current model together with the current strategy should be tested on out-of-sample data (walk-forward period). Out-of-sample walk-forward testing will yield results that will be similar to those achieved during real trading with this model. For more information, refer to Understanding Model-Based Strategies.

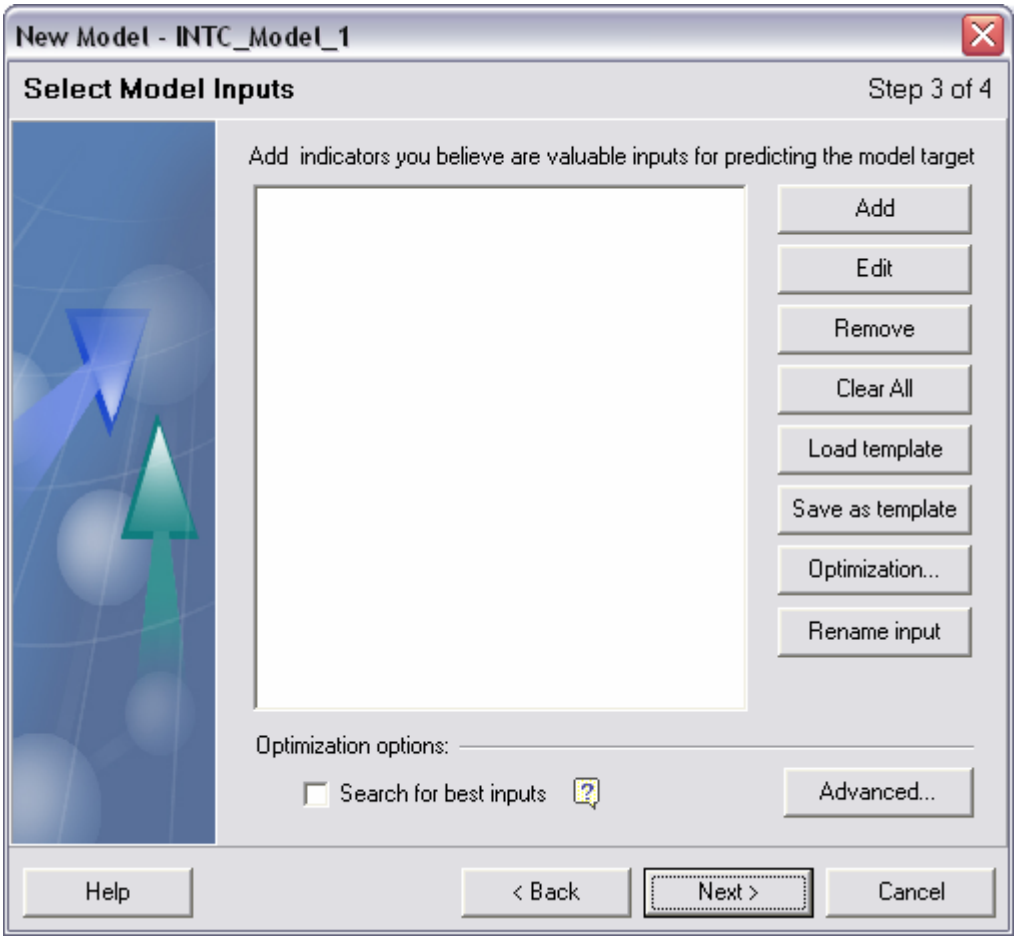
Tradecision automatically tests the current model after each modification of the training or model properties. You can select how much data should be used for automatic walk-forward testing.

The more data you select for the testing, the more patterns are available to test the model with and the more confident you can feel about the results of the test.

However, at the same time, the more data you select for the testing the fewer price patterns are available to train the model. With a smaller amount of data, the training of the model will be less efficient.

It is recommended that one has at least 100 bars for testing.

Step 3: Select Model Inputs



During this step, you need to define the model inputs. You need to select the indicators that as you believe contain valuable data to predict the model target.

To add a model input:

1. Click **Add**.

The *Improvian Editor* window will be displayed.

2. Select a function that you want to use as an input and change its parameters, if required.

3. Click **OK**.

For details, refer to Writing Model Inputs.

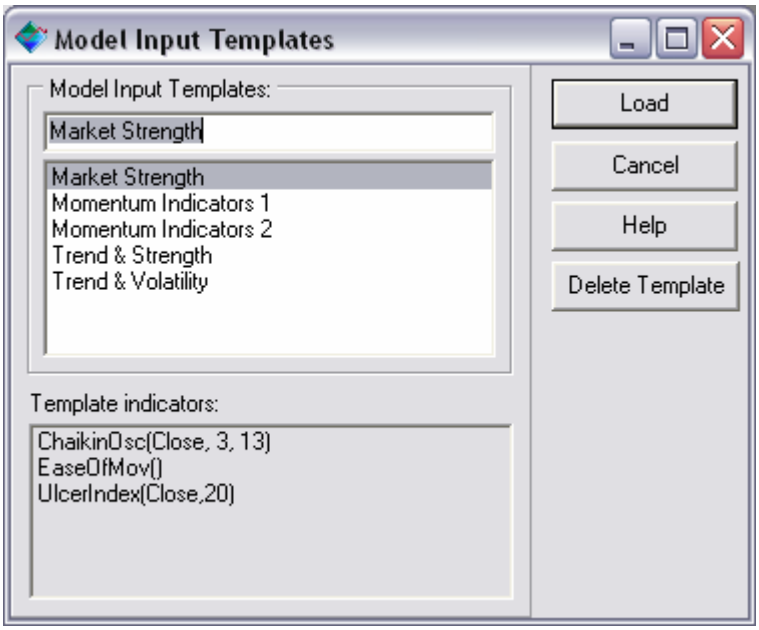
You can edit or delete the selected input using the **Edit** and **Remove** buttons.

You can save your favorite combination of inputs as an input template. The saved templates can be used with new models.

To save a combination of inputs as a template:

1. Click **Save Template** to save the current list of model inputs as a template.

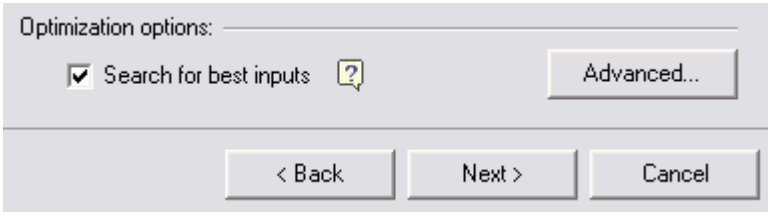
2. Click **Load Template** to load a built-in or previously saved template.



The New Model wizard will help you find the optimal parameters of indicators that you use as inputs, or in other words, will run the optimization algorithm that will exclude insignificant inputs from the model

To optimize inputs:

1. To optimize the inputs, select the **Search for best inputs** check box.



***Note**: Clear this check box if you want to use all the inputs you defined and optimize only the parameters.*

You can use two optimization algorithms: Exhaustive Search and Genetic Algorithms.

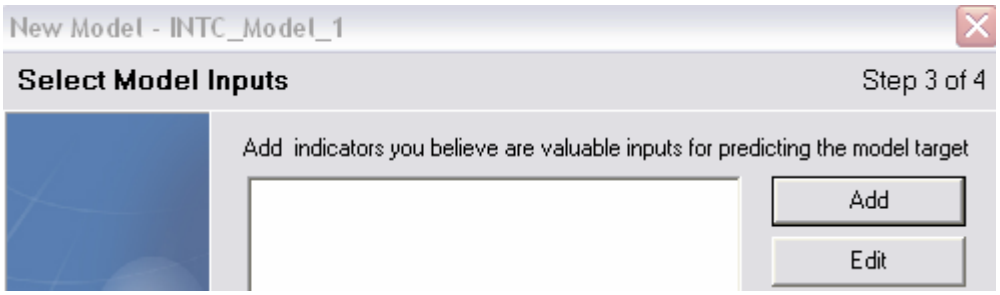
Exhaustive search verifies all possible combinations of optimized parameters and, therefore, can definitely find the best possible solution. However, the time required for exhaustive search increases rapidly when the number of the parameters is incrased. Exhaustive search should be used if you have only a few parameters and small limits set for them.

Genetic Algorithms are search algorithms based on the mechanics of natural selection and natural genetics. They combine the survival of the fittest rule with a structured yet randomized information exchange. The method uses terms accepted in genetics, such as fitness, population, generation, mutation, gene, and so on.

Writing Model Inputs

To write a model input:

1. During Step 3 of the *New Model* wizard, click **Add**.


New Model - INTC_Model_1
Select Model Inputs
Step 3 of 4
Add indicators you believe are valuable inputs for predicting the model target
Add
Edit

The *Improvian Editor* dialog box will be displayed.

2. In the **Categories** area, select the required function or just enter it manually in the **Expression** area, for example, SMA (Close, 9).

3. According to the Improvian syntax, you have to add **"return"** before the SMA and ";" at the end of an expression. Therefore, the input must be written as follows:

   return
   SMA(Close, 9) ;

4. In the **Improvian Editor,** click **OK**.

5. The input will be added to the inputs list with the following name: *SMA(Close, 9)*.

   If you point to it, a message will be displayed, providing information on the input expression.

   You can easily rename an input using the **Rename input** command.

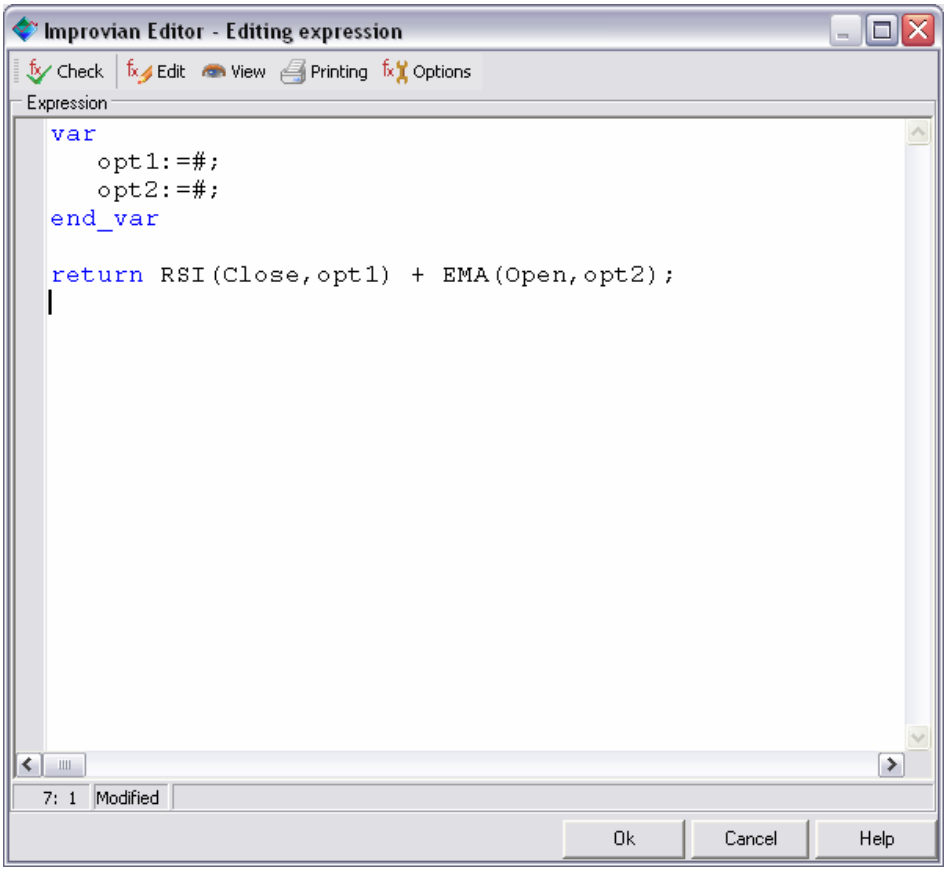
Optimizing Model Inputs

Optimization of input parameters can be done with the help of variables. At the beginning of an expression, you have to declare that you want to use optimization in this input. For example, you would like to have RSI and EMA in one input and optimize their parameters. Your expression can be written in the following way:

```
var
   opt1:=#;
   opt2:=#;
end_var

return RSI(Close,opt1) + EMA(Open,opt2);
```

Where 'opt1' and 'opt2' are optimized parameters.



To add an input with optimized parameters:

1. During step 3 of the **New Model** wizard, click **Add**.

The *Improvian Editor* dialog box will be displayed.

2. In the **Categories** area, select the required function or functions or simply write it manually in the Expression dialog box.

3. With the help of "VAR", declare optimized parameters.

4. In the *Improvian Editor* dialog box, click **OK**.

The input will be added to the inputs list with a name comprised according to the following name mask: **< Complex input #1>**. If you move your pointer to this name, a message providing information on the input expression will be displayed.

Selecting the Right Amount of Input Data

If your historical data has a small number of price patterns, the neural network will not have enough information about your market to train correctly. For daily bars it is recommended to have at least four (better 6+) years of price data (1000-1500+ daily bars) for the network training, and at least six (better 12+) months for walk-forward testing.

Too much data may increase the training time for a neural model, but will not improve forecasting. Additionally, some old price patterns will not simply be valid for the current market situation. Therefore, to reduce the input dataset you need to remove the oldest data.

Selecting Input Columns

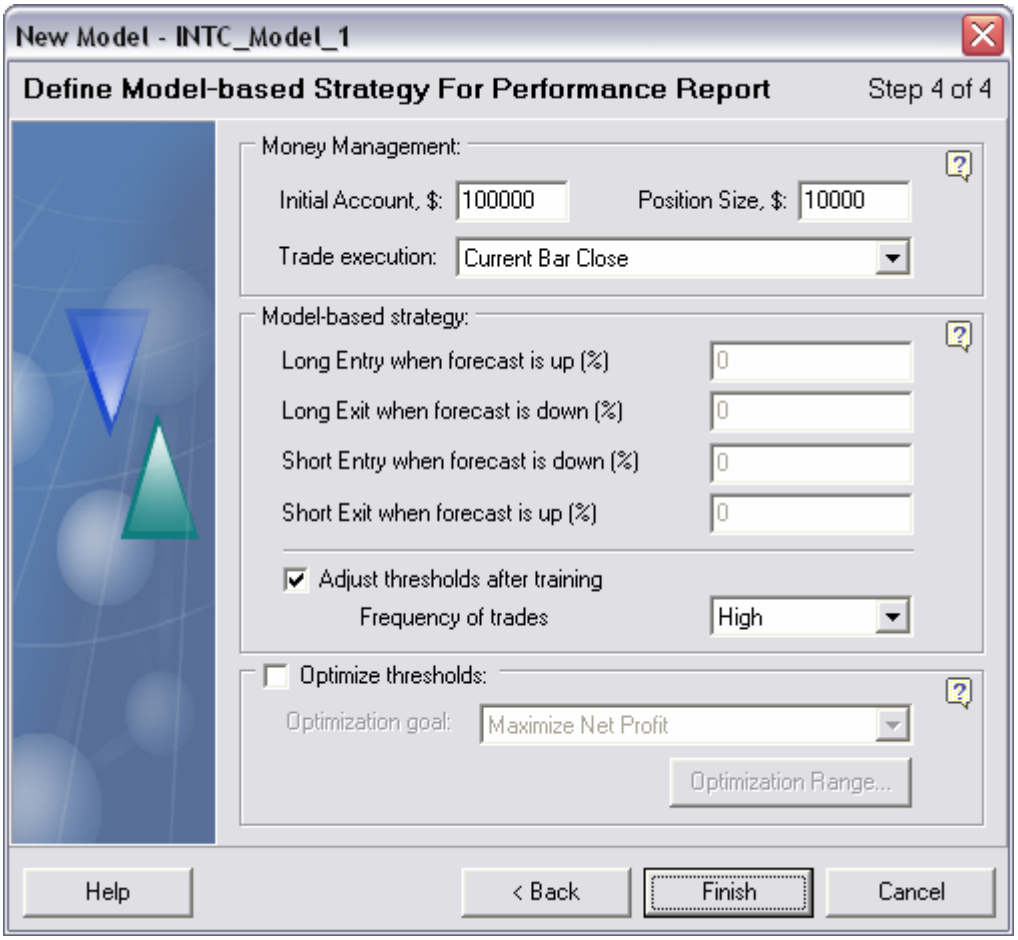
Selecting appropriate inputs is the most important task. Inputs are the only knowledge about the market that will be available to the model to base its forecasting activity on. All data that you believe to significantly affect the value of the target or represent the market situation should be used as inputs.

For example, to forecast what the closing price will be three days from now, you can train the model using **Open**, **High**, **Low**, **Volume**, lags and indicators as inputs and the previous closing prices as the target.

Irrelevant or insignificant inputs may deteriorate the model's performance. Additionally, the more inputs you have the more historical data you need to provide to train the model. With more historical data you will have to spend more time on training your model and run a greater risk of curve-fitting or over-optimization. Curve-fitting occurs when a model simply memorizes the training data and, as a result of which the model's generalization ability is decreased and the level of its forecasting error is raised. For details, refer to *Preventing curve-fitting*.

For example, you should not add Momentum if you are making a forecast for a sideway market. In most cases, this will have a minute impact on your model or will even worsen it. However, do not forget to include oscillators (such as Stochastic or RSI), as they perform well on sideway markets.

Step 4: Defining Model-Based Strategy for Performance Report



To test a neural model, you need to define a strategy based on model forecasts (model-based strategy).

Trading strategies produced by **New Model** wizard are based solely on the model forecasts. These strategies produce buy/sell signals that depend only on model forecasts and, therefore, allow testing the model performance without taking into consideration money management and indicator-based rules.

To define a model-based strategy, you need to specify entry and exit rules for longs and shorts in the **Model-based strategy** area. To specify these rules, you need to define thresholds for triggering buy/sell signals. The thresholds depend on your stock volatility, model goal, minimum profit you are interested it and your risk preferences. The thresholds are specified as percentages (or dollar amounts).

The strategy enters a long position if the forecasted change in price is greater than the threshold specified in the **Long Entry** box.

The strategy exits a long position if the forecasted change in price is less than the threshold specified in the **Long Exit** box.

The strategy enters a short position if the forecasted change in price is less than the threshold specified in the **Short Entry** box.

The strategy exits a short position if the forecasted change in price is greater than the threshold specified in the **Short Exit** box.

The **Position size** box is used to determine what amount should be used to calculate the profit/loss of each position generated by the model strategy. It contains information on the amount traded during each transaction. By default, this value is set to 10'000.

To achieve better results, the thresholds should be adjusted to your stock and current market conditions. You can calculate standard deviation, average true range, volatility, and other factors for your stock and base your thresholds on these calculations. You can also simply define your minimum profit target.

For example, if the purpose of your model is to forecast change of Open price for two days ahead, you can trigger the buy signal only if:

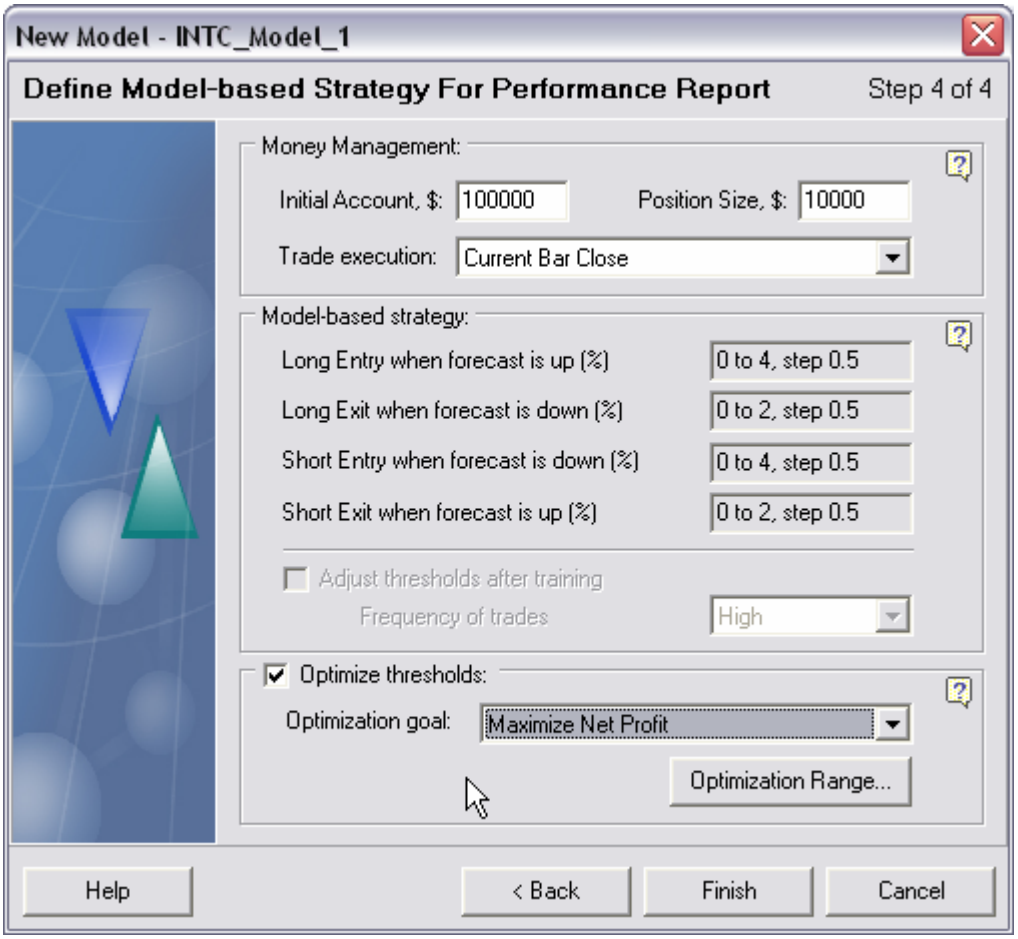
- the forecasted change in price is bigger than the average daily price change;
- the forecasted change in price is twice bigger than the average true range;
- the forecasted change in price is simply 30 points bigger than the current price (your minimum profit target).

The correctly selected strategy thresholds can significantly improve the performance report generated for the model-based strategy. That is why Tradecision features strategy thresholds optimization.

The thresholds can be adjusted automatically using the symbol data volatility and selected target. To enable the feature, use the **Adjust automatically** button.

To include thresholds optimization in the model building process:

1. In the New Model dialog box, select the **Optimize thresholds** check box.

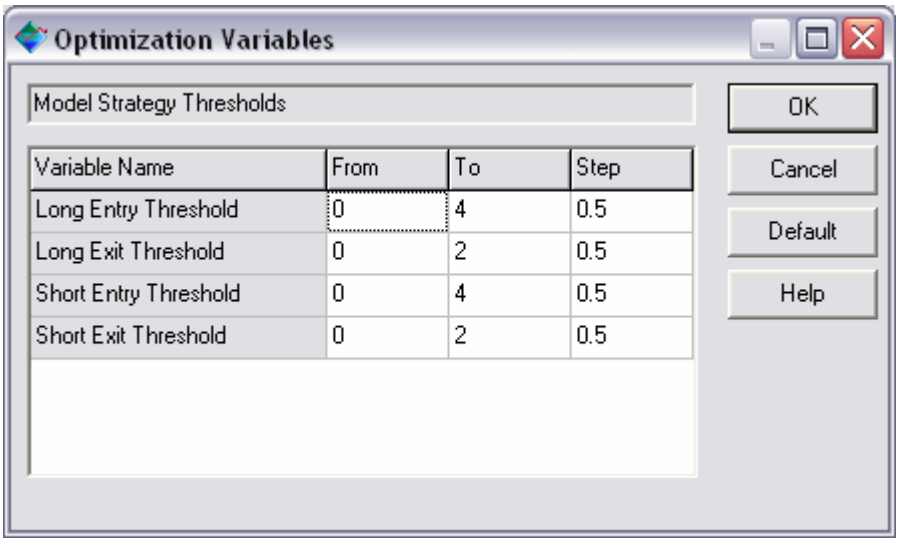


2. From the **Optimization goal** list, select an optimization objective. You can select from multiple options.

1. Maximize Net Profit
2. Minimize Max Drowdown
3. Maximize Ratio Net Profit / Max Drowdown
4. Maximize Ratio Gross Profit / Loss
5. Maximize Percent Profitable Trades
6. Maximize Sharpe Ratio by Trade

3. Click the **Optimization Range** button.

The *Optimization Variables* dialog box will be displayed.



4. In the *Variables Optimization* dialog box, select the limits and step for the threshold optimization and then click **OK**.

***Note**: After the model is selected and trained, its thresholds will be optimized to provide you with the best performance the model can offer.*

After you click **Finish**, a new model will be created, trained and added to the Model Builder database. In Model Builder you will be able to analyze the model and insert its signals into the chart.

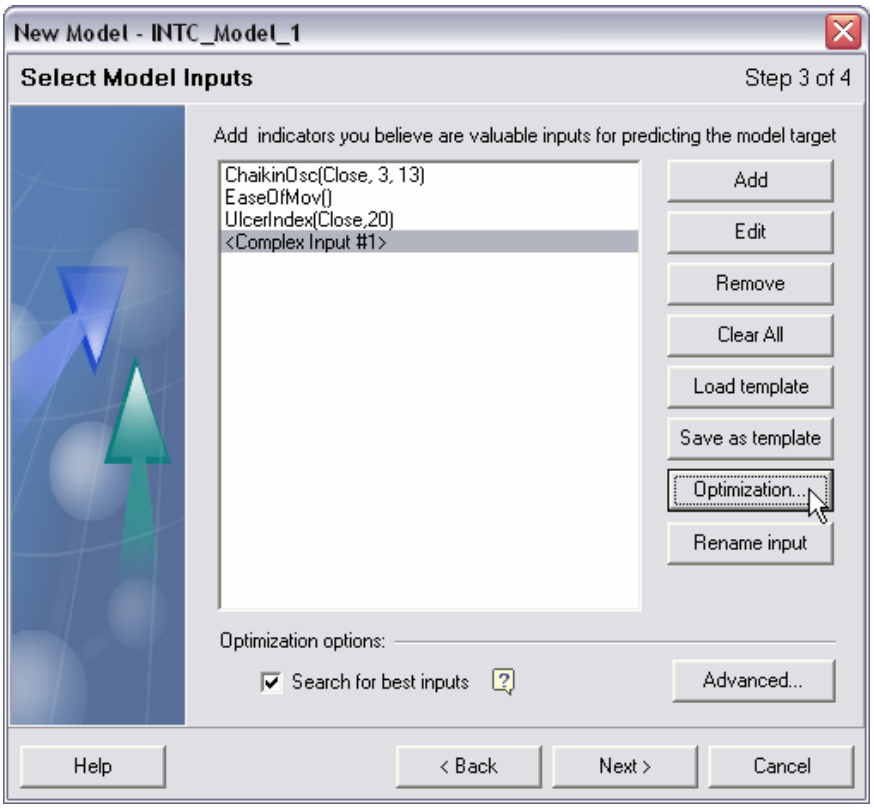
Specifying the Range of the Selected Optimization Variable

The range of the selected optimization variable is specified in the *Optimization Variable* dialog box.

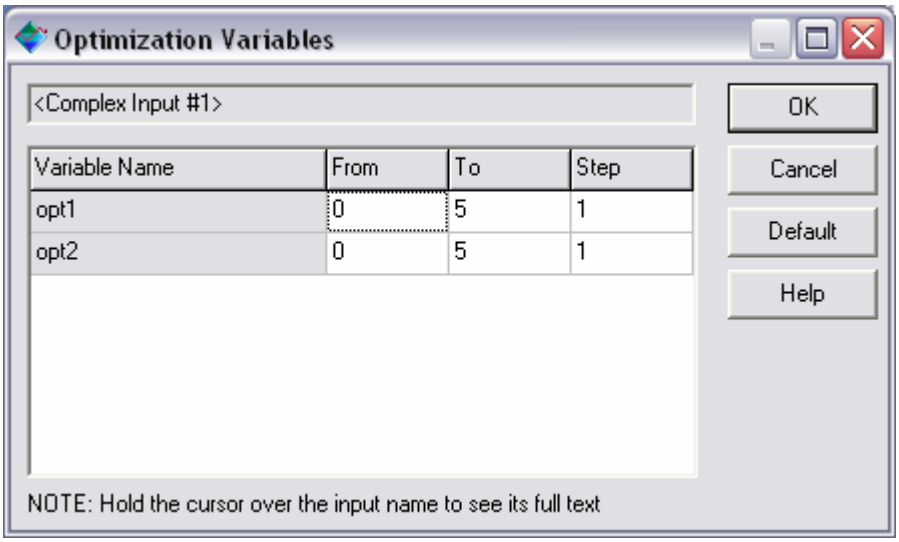
To specify the range of the selected optimization variable:

1. During step 3 of the *New Model* dialog box, select an input that contains optimized parameters.

2. Click **Optimization**.



The *Optimization Variable* dialog box will be displayed. The **Variable Name** column shows the variable that you are currently editing.



3. In the **From** column, enter the minimum value for the optimization variable.

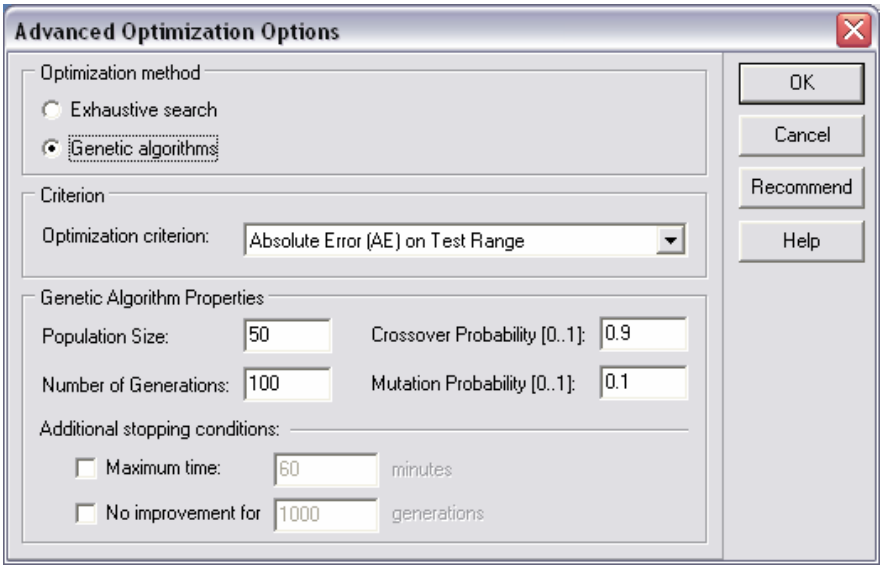
4. In the **To** column, enter the maximum value for the optimization variable.

5. In the **Step** column, enter the step size by which to increment the optimization variable.

For example, if the minimum/maximum range was from 4 to 10, and the step size was 2, the optimization variable will be replaced with the values of 4, 6, 8, and 10.

Specifying the Optimization Algorithm and its Properties

The optimization algorithm and its parameters are specified from the *Advanced Optimization Options* dialog box.



To specify the optimization algorithm:

1. In the **Optimization Method** area of the *Advanced Optimization Options* dialog box, select the type of the optimization algorithm

The following options are available:

- **Exhaustive search**. This method tests all possible combinations of inputs and selects the best combination.

  ***Note**: The method may be too time-consuming if you have a large amount of inputs and a big dataset.*

- **Genetic algorithms**. The method starts with a random population of input configurations. Input configuration determines which inputs are to be ignored during the performance test. During each following step (generation) input configuration uses a process similar to natural selection to select superior configurations and generate a new population. Each step successively produces a better input configuration. During the last step, the best configuration is selected.

  The Genetic algorithms method is very time-consuming but efficient for determining mutually-required inputs and detecting interdependencies. For details, refer to *Introduction to Genetic Algorithms*.

To modify the properties of the Genetic Algorithm:

1. To improve the algorithm's efficiency, in the **Genetic Algorithm Properties** area of the *Advanced Optimization Options* dialog box, enter the following properties:

- **Population Size.** The number of potential configurations used during each step of the algorithm. The larger the population, the bigger is the probability of finding a good configuration and the more time is required to find this solution.

- **Number of Generations.** The number of steps of the genetic algorithm. Each generation is equal to the interval during which a new population is created, using the combination of crossover and mutation. Each new generation is produced by modifying the previous generation with a view to selecting those inputs that produced the best results. The larger the **Number of Generations**, the bigger is the probability of finding a good solution and the more time is required to find this solution.

- **Crossover Probability.** This is the probability of crossover for each configuration during any given generation. The higher is the crossover rate, the stronger is the probability of convergence with a similar set of children (configurations). A lower crossover rate requires a bigger number of generations to explore the search space better.

  ***Note**: Crossover is the process of creating a new configuration using parts of its parent configurations.*

- **Mutation Probability.** Specifies the probability of mutation for each configuration in each new generation. The higher the mutation rate, the better the search possibilities of the algorithm are and the bigger the destruction possibility for good configurations.

  ***Note**: Mutation is the process of altering one or more bits in the inputs configuration (mask).*

Using the Advanced Optimization Criterion

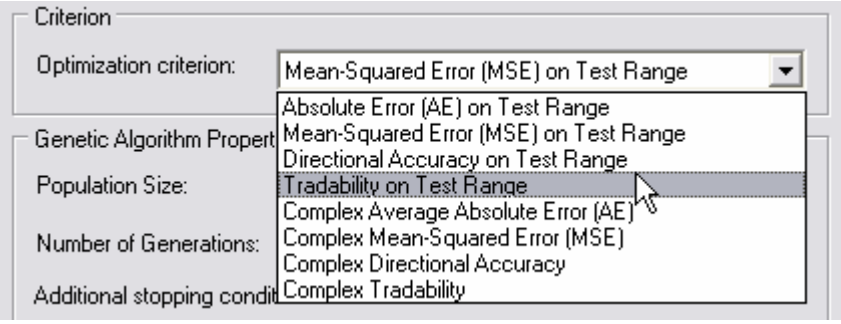
To use the optimization criterion:

1. During Step 3 of the **New Model** wizard, click **Advanced**.

   The *Advanced Optimization Options* dialog box is displayed.

2. In the **Advanced Optimization Options** dialog box, select the **Exhaustive search** or **Genetic algorithms** option.

3. From the **Optimization criterion** list in the **Criterion** area, select the criteria for your neural model's optimization.



The following options are available:

- Absolute Error on Test Range;
- MSE on Test Range;
- Directional Accuracy on Test Range;
- Tradability on Test Range;
- Complex Average Absolute Error (30% on Training Range and 70% on Test Range);
- Complex Directional Accuracy (30% on Training Range and 70% on Test Range);
- Complex MSE;
- Complex Tradability.

4. Click **OK**.

Selecting Additional Stopping Conditions for Genetic Algorithms

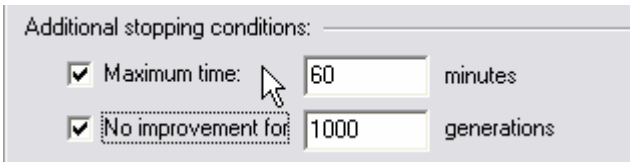
Understanding the Feature

The option can be very helpful when you use Genetic Algorithms as your optimization method. You can use it to prevent excessive use of valuable computer resources. It can be configured in the Genetic Algorithms settings (in the *Advanced Optimization Options* dialog box) when you are creating a neural model or strategy.

This feature has two options:

Maximum Time … Minutes. The algorithm will be automatically stopped after an indicated time.

No improvement for … Iterations. The optimization process can be stopped if the fitness of the best model/strategy has not been improved after an indicated number of iterations.



To define the additional stopping conditions for Genetic Algorithms in Model Builder:

1. During Step 3 of the **New Model** wizard, click **Advanced**.

2. In the **Additional Stopping Conditions** area of the *Advanced Optimization Options* dialog box, select the **Maximum Time … Minutes** and/or **No improvement for … Iterations** check boxes and enter the appropriate numbers in the corresponding text boxes.

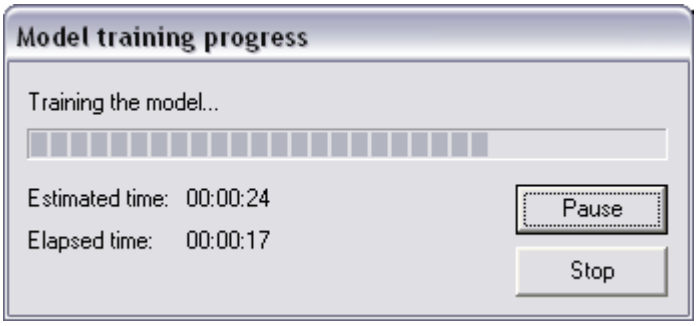
3. Click **OK**.

Training a Model

To start the training or re-training process for a model:

1. To train or re-train a model, select it in the **Model List** and click **Train** on the Model Builder toolbar.

The training process will be started and the **Model Training progress** progress bar will be displayed until the training is complete.



After the training is complete, the model will be automatically tested using the walk-forward test period and you will be able to analyze the model's performance and insert its signals into the chart.

For details, refer to *Model Performance Report*.

Editing a Model

You can modify the properties of a model before re-training it.

To edit the properties of a model:

1. Open **Model Builder**.

2. From the **Model List**, select the model that you want to edit.

3. Click **Edit**.

The New Model Wizard will be displayed, providing information on the currently set model properties.

4. Modify any of the available model properties during the corresponding step and click **Finish**.

Following its modification, the model will be automatically retrained and its performance figures will be automatically updated.

Deleting a Model

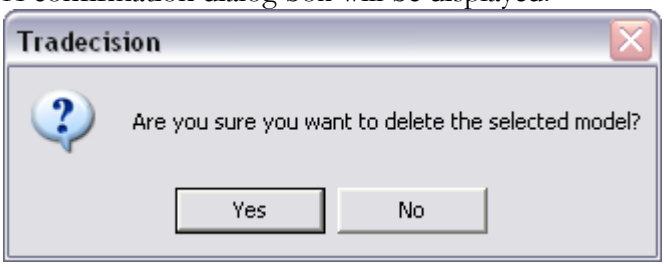
To delete a model:

1. Open **Model Builder**.

2. From the **Model List**, select the model that you want to delete.

3. On the Model Builder toolbar, click **Delete.**

A confirmation dialog box will be displayed.



4. In the confirmation dialog box, confirm the deletion by clicking **OK**.

After the confirmation, the model will be deleted from the internal database.

Analyzing Model Performance

To analyze model performance:

1. Open **Model Builder**.

2. From the **Model List**, select the model that you want to analyze.

3. To select the type of the range that you want to analyze, on the Model Builder toolbar, click **Analyze** and from the **Analyze** list select the **Training range**… or **Test range**…

Note: Test range *is used to analyze the model performance on an out-of-sample period.* ***Training range*** *is used to analyze the model performance on a period that was used to train the model.*

The *Model Report* window will be displayed.

4. In the *Model Report* dialog box select the appropriate tab to analyze the model performance.

The following tabs providing relevant information are available:

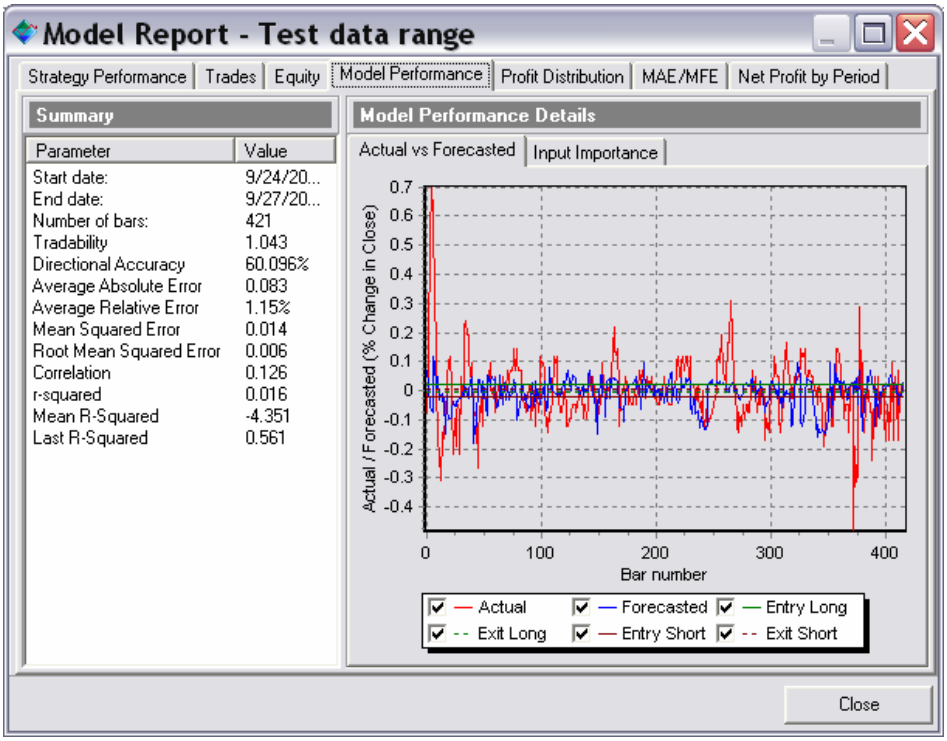
- **Strategy Performance**
- **Trades**
- **Equity**
- **Model Performance**
- **Profit Distribution**
- **MAE/MFE**
- **Net Profit by period**

Viewing Summary Information

Important detailed information on model performance can be viewed in the *Model Performance* tab.

The *Model Performance* tab assists you in analyzing neural model forecasting quality using statistical ratios and graphs. It provides separate sets of figures for the training and walk-forward testing periods. The figures for walk-forward testing are much more important since they represent the model quality you will have when you use the model on new data.

Usually, model performance during the training period will be better than during the testing one. A good model should have good performance during both periods.



***Note**: The model target is a change or some percentage of a change in a price or indicator and model errors (absolute, relative, and MSE) are provided for changes and not for absolute values. If you are comparing two models for different stocks, you should take into consideration the different price levels of different stocks.*

For both periods, the **Summary** table displays the following values:

- **Start date**. The date of the first bar in the corresponding period.
- **End date**. The date of the last bar in the corresponding period.

You should inspect the stock chart visually using the start and the end dates to make sure about the following:

1. The model performance is not caused only by stable trending market in the corresponding period;

2. The market behavior during the training period is not dramatically different from that during the test period. For example, if your training period has only small sideway moves but the test one represents the strong bull market, your model will not be able to provide good signals during walk-forward test period since it wasn't trained to respond correctly on such market situations.

Number of bars. The number of bars in the corresponding period. A small number of bars can be the reason for poor model performance. For details, refer to *Selecting the Right Amount of Input Data*.

Tradability ratio. This kind of ratio compares the model forecasting error with a stock's volatility. If this ratio is below 1, the model should not be used for trading, as it's forecasting error is bigger than or comparable with stock volatility. Models with the tradability ratio within the range from 1 to 2 should be considered moderately tradable and should rather be improved before being used in real trading. Models with the tradability ratio above 2 should be considered tradable, at least from this point of view.

Directional accuracy. This ratio is the number of times the model forecasts and the actual target values moved in the same direction, expressed as percentage. This ratio concentrates only on direction, and not on the size of changes. If your model has good directional accuracy you will be able to make money as you will know the direction for the next market move and even if the size of this move is predicted inaccurately, you will have a profitable position.

Average absolute error. The average of the absolute value of the differences between the forecasted and actual target values. If you are forecasting a change in Close, the amount will represent the average error for predicting change in dollars. If you are forecasting a change in an indicator, the value will represent the average error for predicting a change in indicator points.

Average relative error. The average of the relative value of the differences between the forecasted and actual target values.

Mean Squared Error. The average of the squared value of the difference between the forecasted and actual target values. This type of error is used to indicate models with a lot of forecasting errors bigger than the average.

Correlation. Correlation is a statistical ratio also known as r coefficient or Pearson's correlation coefficient. It measures the linear correlation between the actual target values and model forecasts. The closer this ratio is to 1, the stronger the positive correlation. The closer the ratio is to -1, the stronger is the negative correlation. Small positive and negative values close to zero indicate a poor model with no correlation between the model forecasts and actual values.

r-squared. Squared Correlation.

Mean R-Squared. A statistical ratio that compares the model forecasting accuracy with the accuracy of the simplest model that just use mean of all target values as the forecast for all records. The closer this ratio is to 1, the better the model is. Small positive values close to zero indicate a poor model. Negative values indicate models that are worse than the simple mean-based model.

***Note**: R-squared is not to be confused with r-squared which is only a squared correlation.*

Last R-Squared. A statistical ratio that compares model forecasting accuracy with the accuracy of the model that uses the current values as forecast for all records. The closer this ratio is to 1, the better the model is. Small positive values close to zero indicate a poor model.

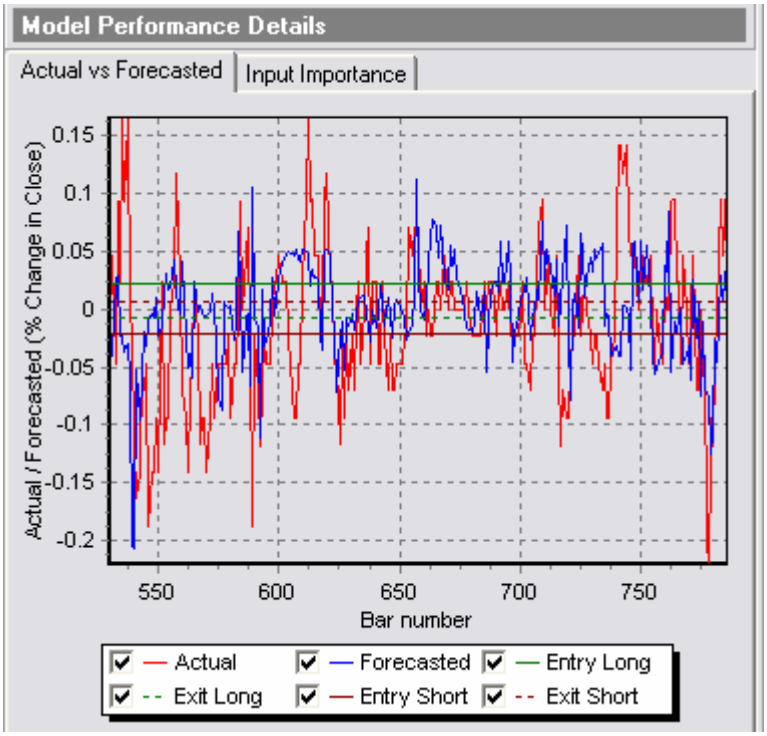
Input Importance Chart

The **Input Importance** tab displays the relative importance of each input column. This chart can help you decide which of the input columns can be safely removed without affecting the model performance. It also helps to understand the most important model inputs (price data and indicators) that have had the biggest influence on the model.

However, you should be careful while interpreting this chart, as the input columns can be interdependent and some of them may work only together or encode the same information.

Actual versus Forecasted Graph

Actual versus Forecasted Graph displays a correlation between the real data and model output. The graph was made on the basis of the forecasted graph (blue) and actual graph (red). You can zoom-in/out/hand-move to analyze the graph and thresholds. The blue and red lines vary in similar amplitudes.



In the test range, the Actual versus Forecasted Graphs should be as close to one another as possible. The blue and red lines should at least have an equalized direction while their magnitude can be different.

Understanding Model-Based Strategies

To test a model, Tradecision applies a simple model-based strategy to historical data and determines whether you would have made a profit if you had followed this strategy, or not. If the strategy turns out to have been profitable, and if it fits your trading personality, you can be confident in using the model to make future trading decisions.

A major advantage of model testing using a model-based trading strategy is the possibility to rigorously test the model over different periods of time and with different parameters. To help you thoroughly analyze a model-based strategy, Tradecision creates the **Strategy Performance Report.** The report provides detailed information about your strategy, including the return on account, drawdowns, risk ratios, number of profitable/losing/outlier trades, as well as timing analysis. To ensure that the figures of the Strategy Performance Report are as close to reality as possible, you can factor in broker's commissions and slippage.

In addition to the Strategy Performance Report, you can analyze equity and drawdown curves for your account. For details, refer to *Equity and Drawdown curves*.

Testing against data that was used to train and optimize neural model (or develop the trading system) is referred to as in-sample testing. A trading system SHOULDN NOT be tested only against in-sample data.

Testing using data that the system was not trained on or optimized against is referred to as out-of-sample or walk-forward testing. The neural network and other system parameters are frozen, and the system is then given data it has not seen before. A system SHOULD be tested against out-of-sample data.

When walk-forward testing is done, a portion of the available price data is not used. This portion is used for testing after the model training and optimization are complete. Walk-forward testing represents a truer measure of system performance in real-time trading.

In-sample testing results can only outline that the trading system has the potential to yield a profit in walk-forward testing and, consequently, yield a profit in real-time trading.

A system must be profitable with both in-sample and out-of-sample data to be used in real-time trading.

For trustworthy testing results, you should make sure your test (in-sample or out-of-sample) results in at least 30 trades per signal. Another good approach is to test your neural model and strategy on different periods of data.

Inspect the stock chart visually to make sure that market behavior during the training period is not dramatically different from that during the test period. For example, if your training period has only small sideway moves but the test one represents a strong bull market, your model will not be

able to provide good signals during the walk-forward test period as it wasnot trained to respond correctly to such market situations.

To increase confidence in the system's profitability, you should also test it against other stocks of the same market type. Most likely, the system will not perform as good as with the stock for which the neural model was designed since neural network tends to learn patterns specific for the stock it was trained against. However, in any case you should achieve tolerable results with other similar symbols.

Preventing Curve-Fitting

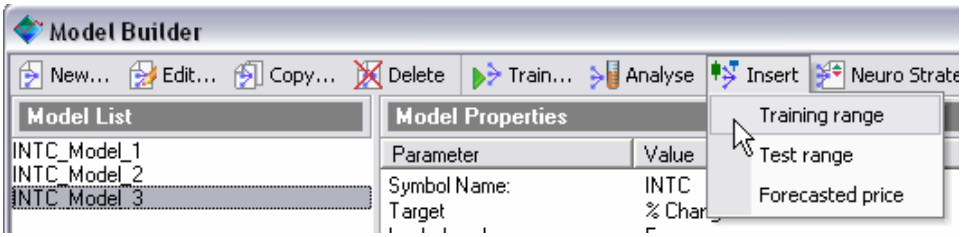
Curve-fitting is a dangerous shortcoming caused by a **neural network's over-training**. When a network is over-trained, it doesn't "learn" price patterns or develop the ability to generalize, but simply memorizes historical price data or, in other words, fits its output to the price curve without learning any internal dependencies.

An over-trained network can produce good results with a training set, but performs unexpectedly badly when used with new data.

Tradecision employs **a special algorithm to identify a clear trend of over-training.** It monitors the validation error dynamics and training progress from different points of view.

Inserting Model Signals into a Chart

You can display the signals generated by a model-based strategy on the corresponding chart. Thus, you can see exactly where the trades occurred, at what price, with what profit/loss, run-up and drawdown. You can insert signals generated during the training or test period. For analyzing real-world model performance, we recommend that you use only the test period signals.

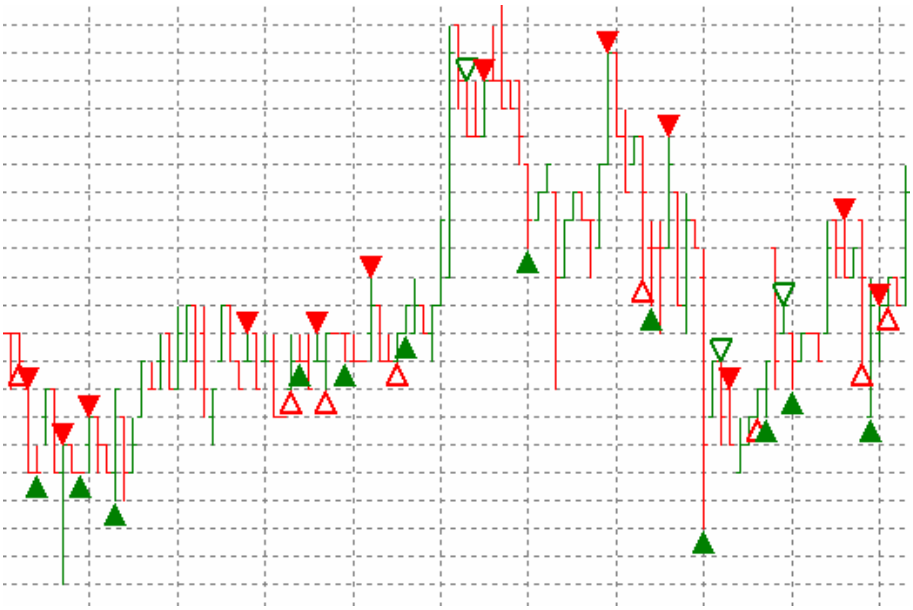


To insert model-based strategy signals into a chart:

1. Open Model Builder.

2. From the **Model List,** select the model whose signals you want to insert.

3. On the toolbar, click **Insert** and select **Training range** or **Test range**.

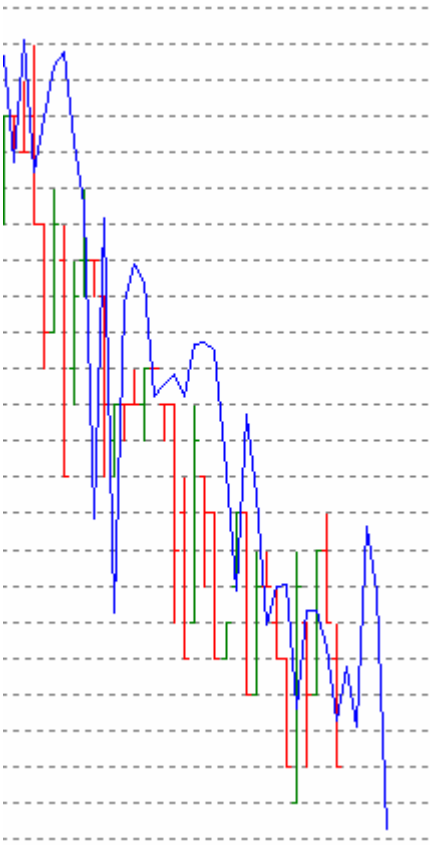


Price Forecasting

To insert a forecasted price into a chart:

1. On the **Model Builder** toolbar, click **Insert** and then select **Forecasted Price**.

   A line will appear in the chart. Now you can see the forecasted direction of the price.



Inserting the Model Output into a Strategy

To insert the model output into a strategy:

1. On the **Model Builder** toolbar, click **Create Neuro Strategy**.

The *NeuroStrategy* dialog box will be displayed, providing model output in the form of the newly created strategy's entry and exit rules.

Saving a Model Output as.csv file

You can save your Model Output (forecasts) as.csv file. You can use this possibility to feed model output to other software for analysis or import it into Tradecision as a Custom Time Series and use in Improvian Editor to build indicators, systems, studies and neural models.

To save a Model Output as.csv file:

1. In the *Model Builder* dialog box, click **Save Model Output to CSV File**.

2. Locate the folder into which you want to save the file on your hard drive.

3. Click **OK**.

To view the Forecasted Price column in a CSV file:

1. On the **Model Builder** toolbar, click **Save Model Output to CSV File**.

2. View the **Forecasted Price** column in the saved file.

Import/Export

With the easy-to-use **Import/Export** tools, you can manage your ideas more effectively. You can easily exchange any of your trading ideas with your friends.

The custom indicators, trading systems, studies and models that you created and saved on your local hard drive can be easily imported, exported and sent by e-mail.

Importing a Neural Model

To import a Neuro-Model:

1. In the *Model Builder* dialog box, click **Import/Export Selected Model** and then select **Import Models**.

The *Import – Models* dialog box is displayed.

2. In the *Import – Models* dialog box, click the button to browse for the folder that you want to import the models from on your local hard drive.

3. Choose the models that you want to import by selecting the appropriate check boxes.

4. Click **Import**.

All the imported models will be added to your **Models List**.

5. Click **Close** to close the *Import – Models* dialog box.

To export a neural model:

1. In the *Model Builder* dialog box, click **Import/Export Selected Model** select **Export Models**.

2. In the *Export – Models* dialog box, click the button to browse the folder on your local hard drive where you want to export the models.

3. Choose the models that you want to export by selecting the appropriate check-boxes.

4. Click **Export**.

The models will be saved in the folder you indicated with the extension **tml**. Now you can send them by e-mail to your friends or partners. He/she will need to use the **Import** command to work with them.

5. Click **Close** to close the *Export – Models* dialog box.

Chapter 14

Strategy Builder

Prior to helping you effectively use your trading account, Tradecision will secure you against the perils of real trading by performing a precise and realistic trading simulation**.** The application will inform you about the future performance of your trading ideas, thus dramatically reducing the risks involved. Tradecision introduces an entire rigorous and sound methodology of evaluating the robustness of your trading system.

Understanding Trading Strategies

A trading strategy is an objective set of rules on when and how to enter and exit positions. This set of rules should not vary subjectively from day to day based on brokers' recommendations, friends' tips or emotions, and, therefore, can be tested using past data to understand objectively how profitable, reliable and suitable to your trading style these rules are. First of all, you need to formalize your own trading ideas or modify/improve well-known ones. To do so, you need to define the conditions for your buy/sell orders.

To define the entry/exit conditions, you can use the Improvian language, offering more than 140 built-in functions, as well as the Improvian Editor, designed to facilitate your rule creation process. If you are new to strategy development, you can start with any of the 10 predefined strategies supplied with Tradecision. All of them are based on well-known trading ideas and can (or even should) be improved to suit your needs.

When your strategy is designed, you need to apply it to historical data to find out whether or not you would have made money if you had traded based on your strategy. The future behavior and profitability of your strategy will be different from those used in the past, but the past performance will give you a good idea about what is likely to occur in the future.

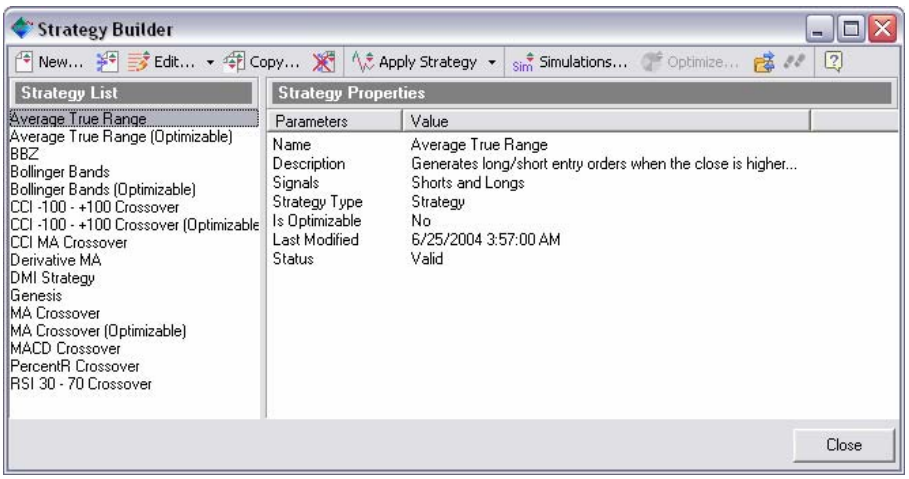
Simulations Manager allows you to realistically simulate your strategy on one or several stocks at once. Once the strategy is simulated, you can analyze your strategy using the buy/sell signals placed on a chart. You can also analyze the Strategy Performance Report that provides you with detailed information on the strategy's profitability, risk, time analysis and more. Additionally, you can analyze the Trades report with over 10 ratios for each your trade, as well as Equity and Drawdown curves.

Once you have determined the disadvantages of your trading system, you can correct them and test the strategy again until you feel confident enough about using the strategy to make future trading decisions.

Using Strategy Builder

Tradecision **Strategy Builder** allows designing, historically testing and fine-tuning your trading strategies.

Strategy Builder is an easy-to-use tool for managing trading strategies. You can create, edit, copy, and delete a strategy, insert a strategy into a chart, and perform strategy simulations or optimization.



Strategy Builder contains a built-in point-and-click Money Management Editor that enables easily creating stop-loss, trailing stop and profit target rules, as well as allows you to use such sophisticated position sizing techniques, as Optimal F, Kelly, Williams and Fixed Fractional Trades approaches.

To launch Strategy Builder, from the **Tools** menu, select **Strategy Builder**.

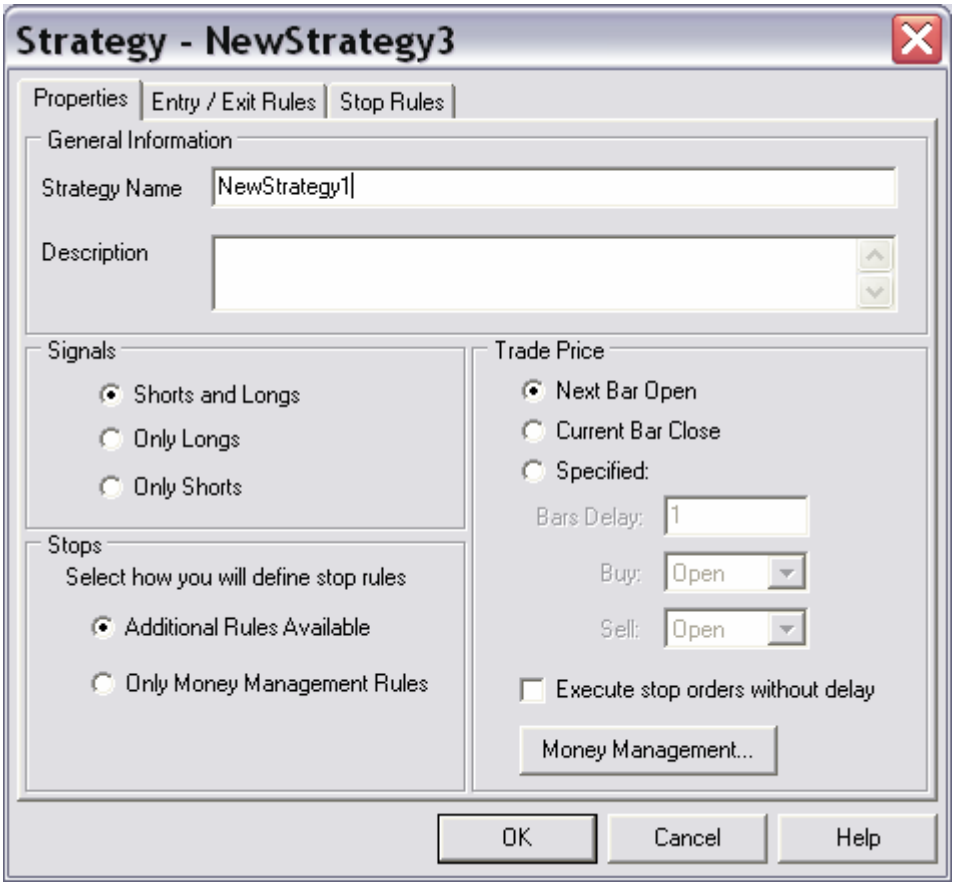
The *Strategy Builder* dialog box contains a toolbar with commands, a list of your strategies and a pane that contains parameters for the selected strategy.

To work with a strategy, you need to select it in the strategies list and click the corresponding toolbar button. See the following chapters for detailed instructions on using the Strategy Builder capabilities.

To create a new strategy:

1. In the *Strategy Builder* dialog box, click **New...**

The *Properties* tab of the *Strategy* dialog box will be displayed.



2. In the **General Information** area of the *Properties* tab, enter the following information:

- **Strategy name.** Enter the name of the strategy(for example, QQQ_Strategy);

- **Description.** Enter a description of the strategy being built.

3. In the **Signal** area, select your trading preferences by selecting the corresponding option. The following options are available:

- **Shorts and Longs;**
- **Only Shorts;**
- **Only Longs.**

4. In the **Stops** area, select the **Additional Rules Available** option and define manually your stop-loss and trailing stop rules.

5. Select the **Only Money Management rules** option to define your stop-loss, trailing stop and profit target rules using the Tradecision point-and-click Money Management Editor.

6. In the **Trade Price** area, select the order execution price to enable realistic trading simulation.

You can indicate that orders be executed at the Close of the current bar, at the Open of the next bar or you can also define custom trade price and delay separately for buy/cover and sell/short orders.

7. For Stop Loss and Trailing Stop orders to be executed immediately in your stop rules, select the **Execute stop orders without delay** check box.

8. Click **Money Management** to define the position size and configure its prarameters**.**

9. Select the *Entry/Exit Rules* tab and define the rules for your trading system.

Note*: To define the rules, you need to click* ***Edit*** *in the Entry/Exit Rules tab and use* ***Improvian Editor*** *and the Improvian language.*

10. If you selected the Additional Rules Available option during Step 7 of his procedure, select the *Stop Rules* tab and define your stop-loss and trailing stop rules.

11. Click **OK**.

A new strategy will be created and stored into Strategy Builder. Now you can insert it into a chart, run a simulation for several securities or optimize it.

Creating a New Neural Strategy

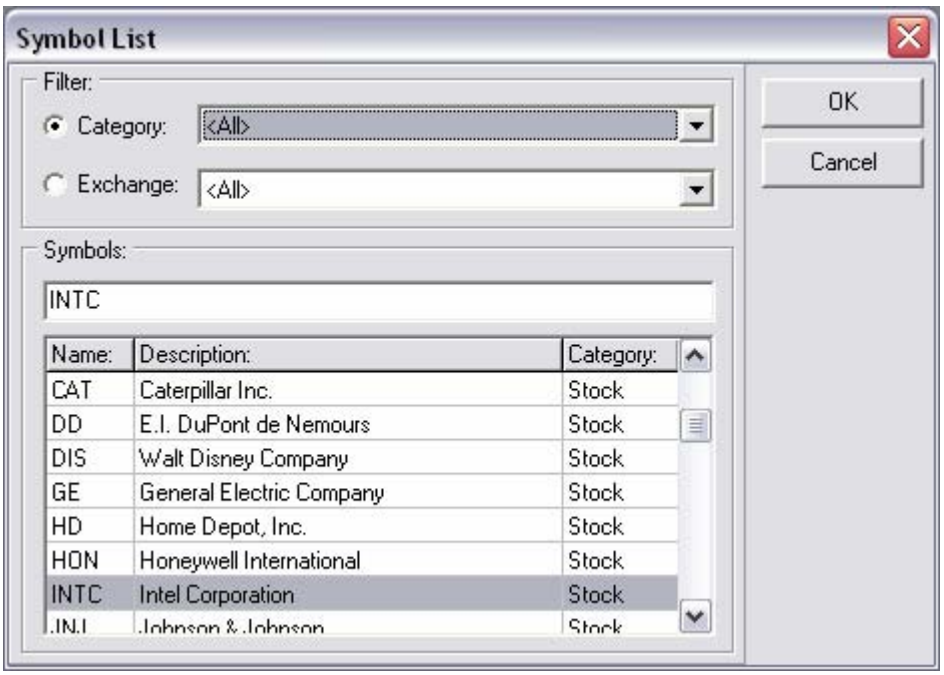
A neural strategy is a strategy whose rules are based on neural model predictions. Neural strategy can be created only for one symbol.

***Note**: Before creating a new neural strategy, you need to create an appropriate neural model for the symbol. A new neural model can be easily created using the New Model wizard.*

To create a new neural strategy:

1. In the *Strategy Builder* dialog box, click the **New Strategy**.

The *Symbol List* dialog box will be displayed.

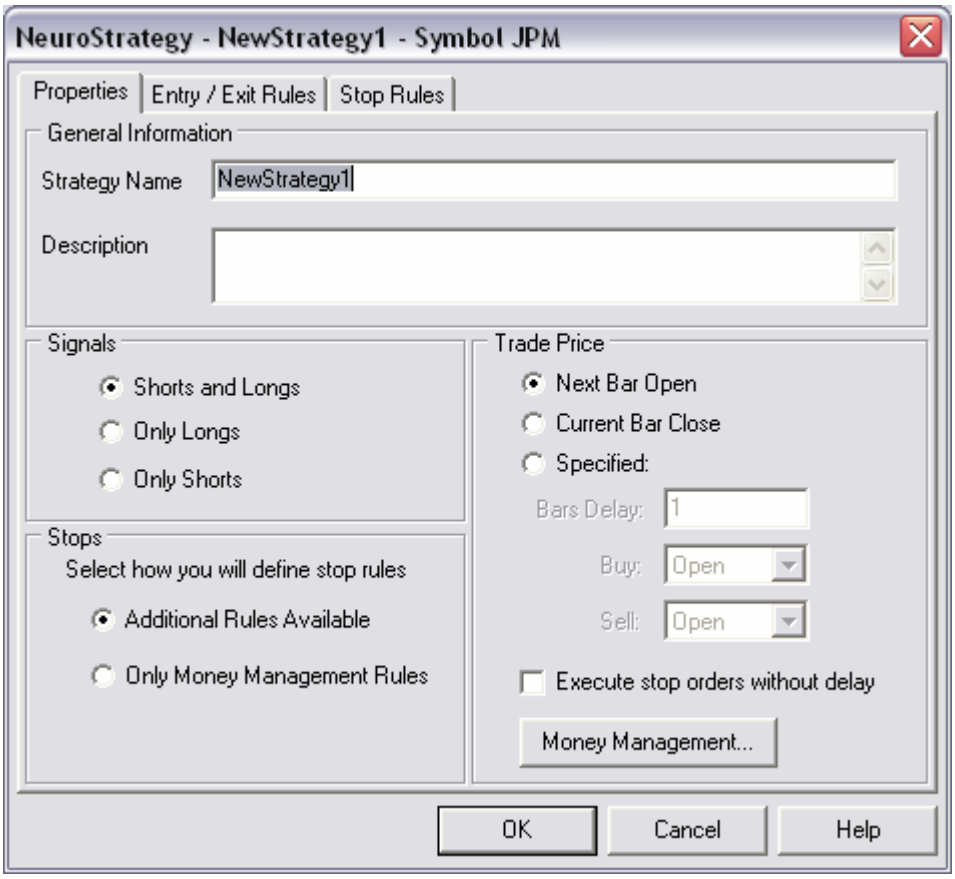


2. From the **Symbols** list in the *Symbol List* dialog box, select a symbol.

***Note**: To perform a search for the required symbol, use the filtering functionality in the **Filter** area of the box. The system enables searching for symbols by Category and Exchange.*

3. Click **OK**.

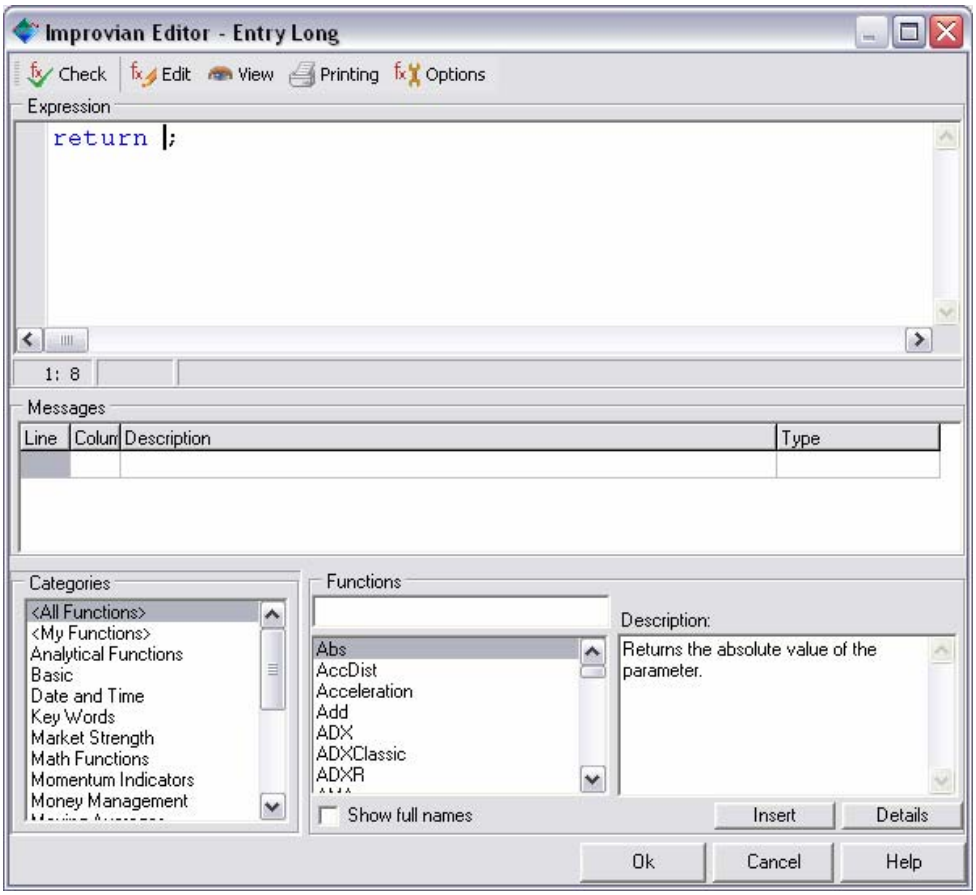
The *NeuroStrategy* dialog box will be displayed.



4. In the *Parameters* tab of the *NeuroStrategy* dialog box, select the strategy name, description and parameters. For details, refer to *Creating a New Strategy*.

6. To define each rule, select the *Entry/Exit Rules* tab and then click **Edit**.

7. Open **Improvian Editor.**



In the **Categories** list a new function category named **Models** will be displayed. The category will contain all models created for the strategy symbol.

8. Select the model that you want to use and click **Insert**.

The name of the model will be inserted into the **Expression** box and can be used as a function name for the conditions that you want to define.

9. Click **OK**.

A new neural strategy will be created and stored into Strategy Builder. Now you can insert it into a chart, run a simulation for the corresponding symbol or optimize it.Selecting Order Type

Understanding Order Types of Trading Strategies

Tradecision enables you to control the way you enter or exit the market when you are developing a trading strategy. Using orders you can back-test your trading strategies with a high degree of approximation to real trading.

The Market Order

A buy or sell order in which the broker is to execute the order at the best price currently available. The market order is the most frequently used order. It is a good order to use after you have made a decision about opening or closing a position. The market order is executed at the best possible price obtainable at the time the order reaches the trading pit.

The Limit Order

An order to buy a particular quantity of a security at or below a specified price or to sell it at or above a specified price (called the limit price) sent to a broker. This ensures that the buyer will never pay more for the stock than whatever price is set as his/her limit. This order is one of the two most common types of orders, the other being a market order. It is opposite to the no limit order.

Stop Orders

Stop orders can be used for the following purposes:

- To decrease a loss on a long or short position;
- To protect a profit on an existing long or short position;
- To initiate a new long or short position.

A buy stop order is placed above the market and a sell stop order is placed below the market. After the stop price is reached, the order is treated as a market order and will be filled at the best possible price.

Stop Limit Orders

A stop limit order is a stop order that becomes a limit order if and when the market reaches a designated price.

Selecting an Order for a Strategy

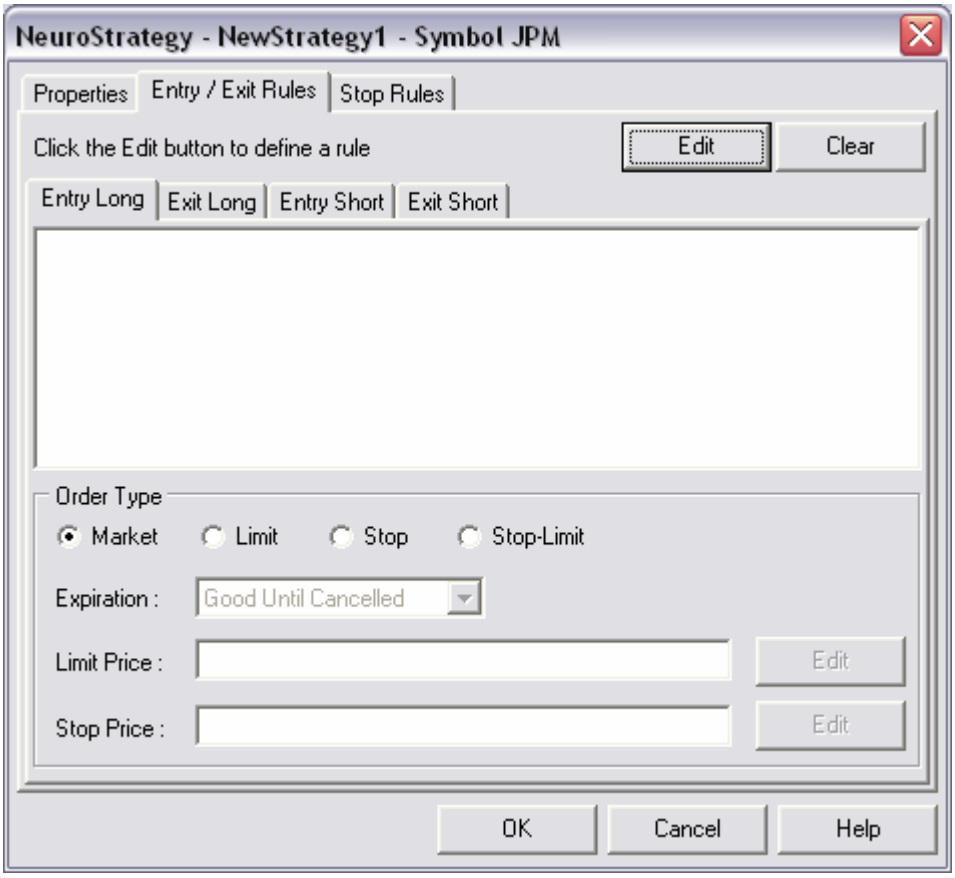
To select an order for a strategy:

1. In the *Strategy Builder* dialog box, click **New...**

The *Properties* tab of the *Strategy* dialog box will be displayed

2. From the *Entry/Exit Rules* tab of the *Strategy* dialog box, select the type of order that you want to use in your trading strategy. The following options are available:

- **Market;**
- **Limit;**
- **Stop;**
- **Stop-Limit.**



3. To define your Limit and Stop-Limit, from the **Expiration** list, select the appropriate period. . The following options are available:

- **Good Until Cancelled;**
- **Good For Day.**

***Note**: A Good Until Cancelled order to expire at the end of a specified future date. A "Day Only" order will expire at the end of the current trading day.*

2. To specify the limit price and stop price, click **Edit** next to the **Limit Price** and **Stop Price** boxes.

   Limit price is the price specified in a limit order.
   Stop price is the price specified in a stop order.

Inserting a Strategy into a Chart

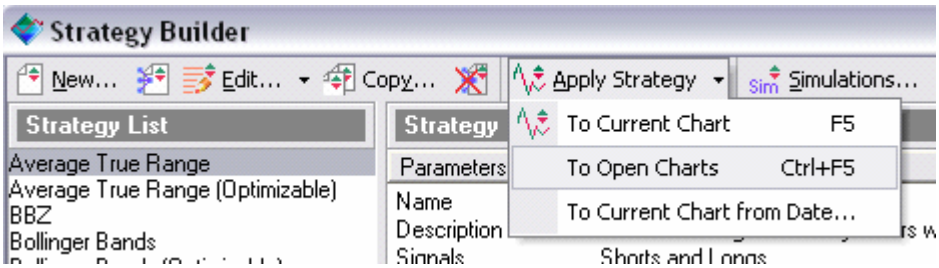
In Tradecision, any strategy can be inserted into the active chart with one click.

1. Open Strategy Builder.

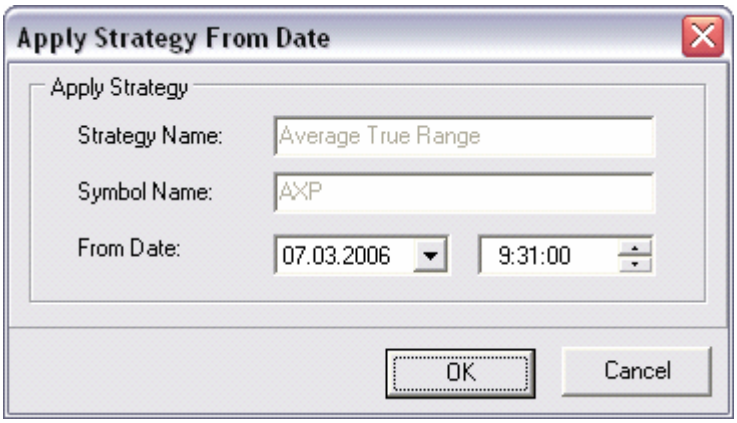
2. In the *Strategy Builder* dialog box, select the strategy that you want to insert.

3. On the Strategy Builder toolbar, click **Apply Strategy** and from the **Apply Strategy** menu select the destination where you want the strategy to be inserted. The following options are available:

- **To Current Chart**
- **To Open Charts**
- **To Current Chart from Date**



If you have selected **To Current Chart from Date,** the *Apply Strategy From Date* dialog box is displayed.



4. In the *Apply Strategy From Date* dialog box, next to **Form Date**, select the required date and time and click **OK**.

A strategy simulation will be automatically created and run. After the simulation is completed, a notification message will be displayed. Click **OK**.

5. In the *Strategy Builder* dialog box, click **Close**.

Now you see the strategy signals on the chart(s).

***Note**: If you switch from daily to weekly or monthly bars, strategy signals will be regenerated automatically. Additionally, if you download or import any new price data in Data Manager, your chart will be automatically updated and new signals will be generated for the new data.*

Editing a Strategy

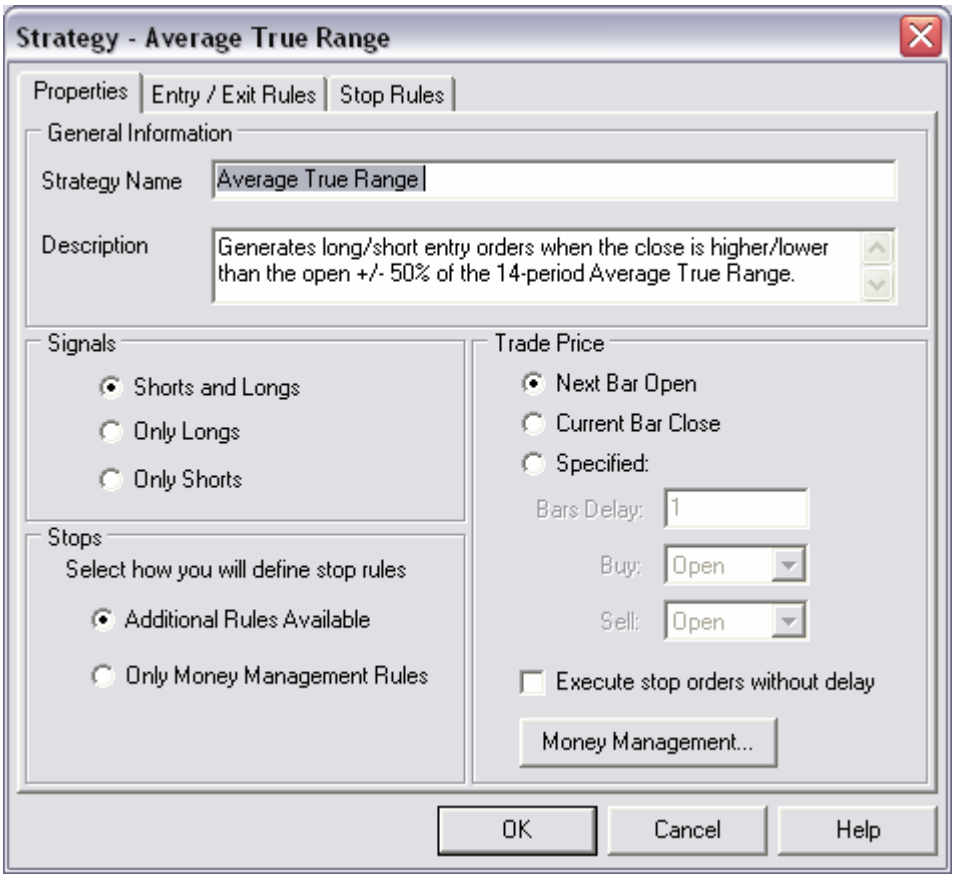
You can modify a strategy any time.

To edit a strategy:

1. In the *Strategy Builder* dialog box, select the strategy that you want to modify.

2. Click **Edit.**

The *Strategy* dialog box will be displayed.



3. In the *Properties* tab of the *Strategy* dialog box, modify the required parameters

–AND/OR –

select the *Entry/Exit Rules* tab, click **Edit** and edit the strategy rules as appropriate.

4. Click **OK**.

Copying a Strategy

If you plan to create a strategy that is similar to an already existing one, you can save your time using the **Copy** command.

To copy a strategy:

1. In the *Strategy Builder* dialog box, click **Copy.**

The *Strategy* dialog box will be displayed.

2. In the **Name** box of the *Properties* tab, change the name of the strategy.

3. Change other parameters and strategy rules as appropriate.

4. Click **OK**.

A new strategy will be created and added to the **Strategy List**.
Now you can insert it into a chart, run a simulation for several securities or optimize it.

Deleting a Strategy

To delete a strategy from Strategy Builder:

1. In the *Strategy Builder* dialog box, select the strategy that you want to delete.

2. Click **Remove Strategy.**

A confirmation dilog box will be displayed.

3. In the confirmation dialog box, click **Yes**.

The strategy will be deleted.

Importing and Exporting a Strategy

All the custom indicators, trading systems, studies and models that you have created and saved on your local hard drive can be easily imported, exported and sent by email.

Importing Strategies

To import strategies:

1. In the *Strategy Builder* dialog box, click **Import/Export**, and then **select Import Strategies**.

The *Import – Strategies* dialog box will be displayed.

2. In the *Import – Strategies* dialog box, click the button to browse for the folder on your local hard drive from which you want to import the strategies.

3. Choose the strategies that you want to import by selecting the corresponding check-boxes.

4. Click **Import**. All the imported strategies will be added to your **Strategy List**.

5. Click **Close** to close the *Import – Strategies* dialog box.

Exporting Strategies

To export strategies:

- In the *Strategy Builder* dialog box, click **Import/Export**, and then select **Export Strategies**.

The *Export – Strategies* dialog box will be displayed.

2. In the *Export – Strategies* dialog box, click the button to browse for the folder on your local hard drive to which you want to export the strategies.

3. Choose the strategies that you want to export by selecting the corresponding check-boxes.

4. Click **Export**.

The strategies will be saved to the selected folder with the extension.**tsg**.

Now you can send them by email to your friends or partners. The recipient will need to use the Import command to work with them.

5. Click **Close** to close the *Export – Strategies* dialog box.

Strategy optimization (Professional Editions)

Understanding Strategy Optimization

Optimization is the process of performing multiple tests while varying the parameters used in the strategy rules. The purpose of optimization is to discover the most profitable settings for a rule when applied to a specific security. Optimization is used to improve profitable trading ideas. It should be used after a trading system has proven suitable for your risk preferences and profit objectives. Do not use optimization to build a strategy or turn a bad strategy into a good one.

You should find profitable trading ideas and/or build profitable neural models. After that, you should test and improve them with several securities until you can entrust your money to this strategy. And only then you can use optimization to make sure that you are using the optimal parameters for entry/exit conditions.

To find the optimal parameters, you need to replace the numeric constants in the trading rules with optimization variables. You can use any name for an optimization variable, but the variable must be preceded by the "#" character. For example, if you want to find the optimal moving average length, you must write "SMA(Close, #length) instead or SMA(Close, 14) in your trading rule.

Additionally, you need to specify the range (minimum, maximum) and step (increment) for each optimization variable.

***Note**: the more optimization variables you have and the more values have to be tested for each variable, the longer the optimization process will take.*

The optimization process can take seconds, minutes or hours depending on the number of simulations being run. To reduce the time required for optimization, you can either reduce the number of the optimization parameters, or use Genetic Algorithms for the optimization.

In those cases, when you have multiple optimization variables and wide search ranges, the Genetic Algorithms work much faster than the exhaustive search, while remaining very robust.

After the optimization, you can view and analyze the Strategy Performance Report and Trades Report - on each combination of values tested, as well as the combination's Equity and Drawdown curves. The best combinations can be saved as separate strategies.

Understanding Optimization Algorithms

Your strategy parameters can be optimized using Genetic Algorithms (GA) or exhaustive search.

Exhaustive search verifies all possible combinations of the optimized parameters and is, therefore, sure to find the best possible solution. However, the time required for conducting exhaustive search is dramatically increased when the number of the parameters increases. Exhaustive search should be used if you have only a few parameters and small limits for them.

Genetic Algorithms are search algorithms based on the mechanics of natural selection and natural genetics. They combine the survival of the fittest rule with a structured yet randomized information exchange. The method uses terms accepted in genetics, such as fitness, population, generation, mutation, gene, and so on.

In contrast to random search methods (such as, for example, Monte Carlo) genetic algorithms are not a simple random walk. These algorithms efficiently use historical information to speculate on new search points with expected improved performance. Their goal is forming or finding a population of trading strategies that will have the best fitness level, or in other words, the best optimization criteria values.

Genetic algorithms possess the best characteristics of the other optimization methods, such as robustness and fast convergence, which does not depend on any of the optimization criteria (for instance, on smoothness).

Although genetic algorithms are much faster while searching a large number of possible options, they are slower than exhaustive search as far as a small search space is concerned.

Walk-Forward Testing (Strategy Builder)

Understanding Walk-Forward Testing

Tradecision does automatic walk-forward testing, which is significant in that it gives you confidence in successfully trading with your optimized strategy.

Most trading software applications do not provide this advanced feature, which enables automatic generation of powerful tests.

With walk-forward testing, you can perform a strategy optimization by defining the test date ranges that give you the power to select the stock parts that you want to use for optimization and out-of-sample testing.

Testing a trading strategy against the data that was used to optimize the trading system is referred to as in-sample testing.

***Note**: A trading system SHOULD NOT be tested only against in-sample data.*

Testing that using data the system was not optimized against is referred to as out-of-sample or walk-forward testing. The system parameters (optimization variables) are frozen, and the system is then fed data it has not seen before. A system SHOULD obviously be tested against out-of-sample data.

When walk-forward testing is done, a portion of the available price data is not used. This portion is used for testing after the strategy optimization is complete. Walk-forward testing represents a truer measure of system performance in real-time trading.

In-sample testing results can only show that a trading system has the potential to generate profits in walk-forward testing and, consequently, in real-time trading too.

A system must be profitable with both in-sample and out-of-sample data to be used in real-time trading.

For trustworthy testing results, you should make sure your test (in-sample or out-of-sample) results in at least 30 trades per signal. Another good approach is to test your strategy using different periods of data.

Inspect stock chart visually to be sure that market behavior during optimization period is not dramatically different from the market during walk-forward testing. For example, if your optimization period has only small sideway moves but the test period represents a strong bull market, your model will not be able to provide good signals during walk-forward test period since it wasn't optimized to respond correctly to such market situations.

To increase confidence in system profitability you should also test it against other stocks of the same market type. Most likely, the system will

not perform as good as with the stock for which it was optimized, but in any case you should get tolerable results with other similar symbols.

Strategy Optimization Wizard

The Strategy Optimization wizard will guide you step by step through the optimization process.

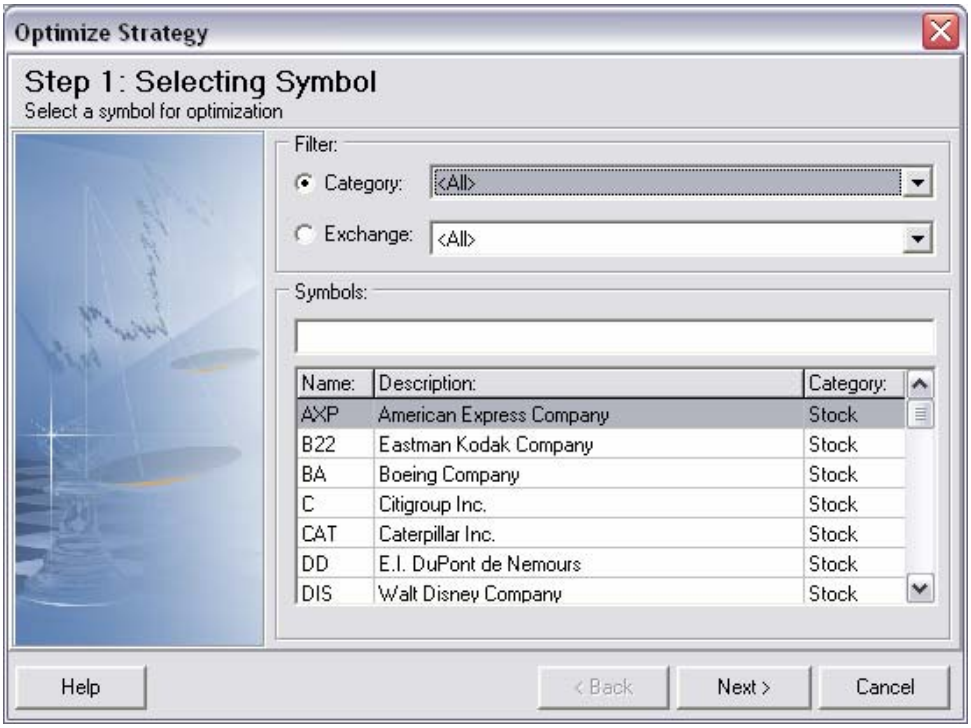
Starting the Strategy Optimization wizard

To start the Strategy Optimization wizard:

1. To start the wizard in **Strategy Builder**, select the strategy that you want to optimize and click **Optimize**.

Note: *The selected strategy should contain optimization variables in its rules.*

Step 1: Selecting Symbol

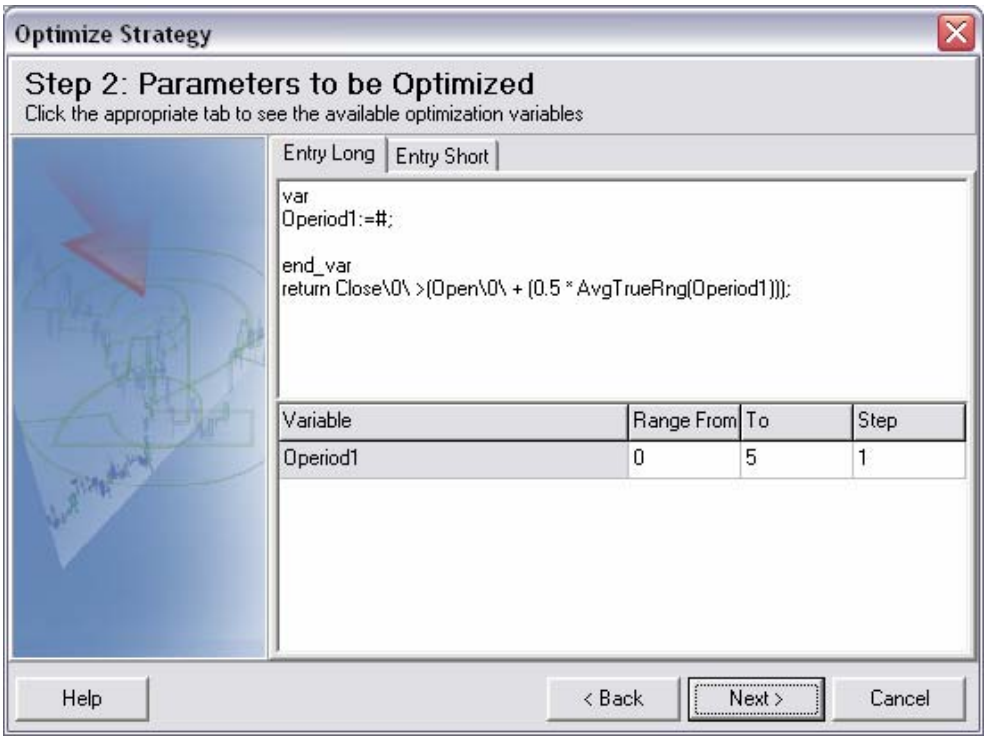


During this step, you need to select the security for which you want to run the optimization.

The security that you want to optimize can be selected in the **Symbols** area.

You can sort the **Symbols** table by name, description or category. To do this, you need to right-click the corresponding column caption. You can also use the filtering functionality in the **Filter** area of the window to display only those symbols that belong to the selected category or exchange. Alternatively, you can type the name of the symbol in the **Symbols** box. The system will select the specified symbol from the list and display it.

Step 2: Parameters to be Optimized



During this step you need to specify the search ranges for the optimization variables in your rules.

In the upper section of the window, there are two tabs–, the *Entry Long* tab and the *Entry Short* tab, – containing rules with the optimization variables (such as Operiod1). To select a rule whose optimization variable you want to edit, select the corresponding tab.

The **Variable** section of the window contains a table with the optimization variables used in the selected rule.

The **Variable Name** column shows the variable that you are currently editing.

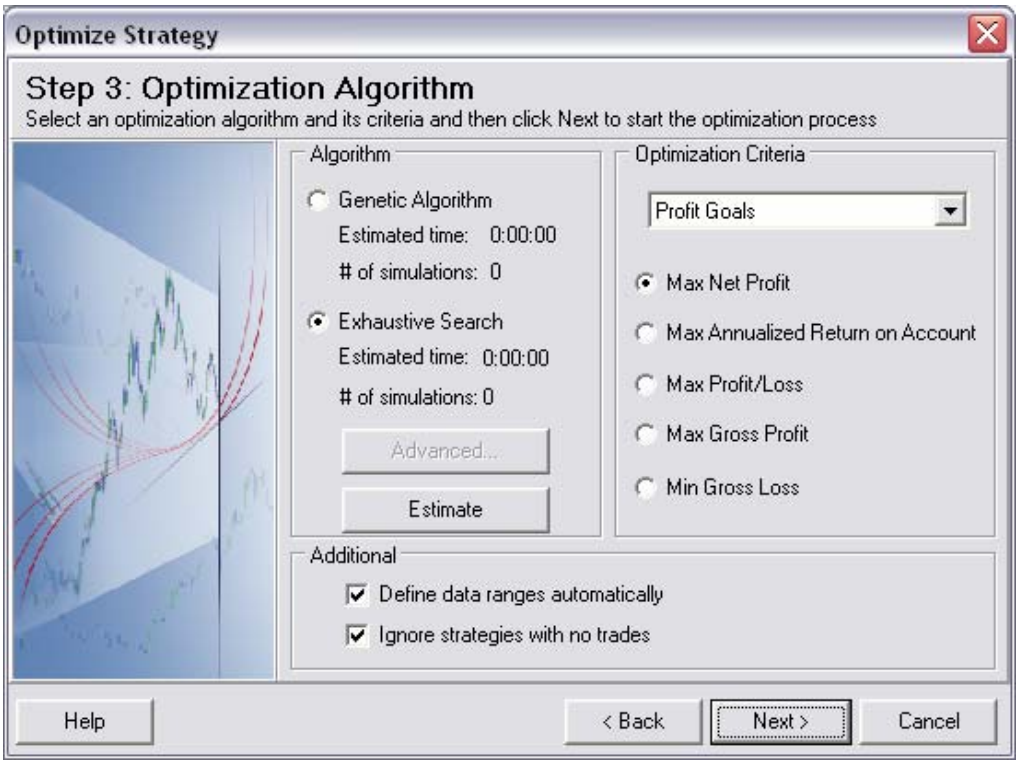
In the **Range From** column, enter the minimum value for the optimization variable.

In the **To** column, enter the maximum value for the optimization variable.

In the **Step** column, enter the step size by you want the optimization variable to be incremented.

For example, if the minimum/maximum range is 4 to 10, and the step size is 2, the optimization variable would be will be assigned with the values 4, 6, 8, and 10.

Step 3: Optimization Algorithm



During this step, you need to select the optimization algorithm and goal.

In the **Algorithm** area, select the algorithm you want to use for the optimization:

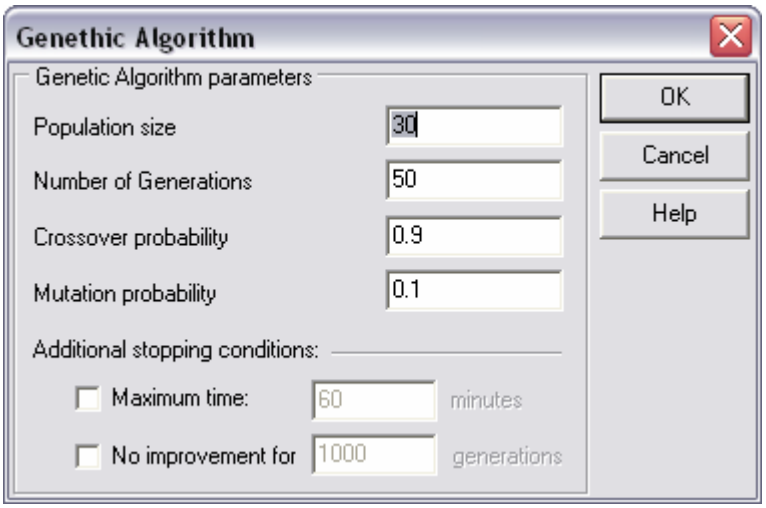
The following options are available:

- **Exhaustive search**. The method tests all possible combinations of inputs and selects the best combination.

  ***Note**: The method can be very time-consuming if you have a large amount of inputs and a big dataset.*

- **Genetic algorithms**. The method starts with a random population of input configurations. Input configuration determines which of the inputs are ignored during the performance test. During each of the following steps (generations) input configuration uses a process that is similar to natural selection to select superior configurations and use them to generate a new population. Each step successively produces better input configuration. At the last step the best configuration is selected. The method is very time-consuming but good for determining mutually-required inputs and detecting interdependencies.

  The Genetic Algorithm parameters can be modified. To display the Genetic Algorithm Parameters, click **Advanced**.



In the **Categories** area, select a category for the optimization goal. In the **Optimization Criteria** area, select the optimization goal.

Genetic Algorithm Parameters

The Genetic Algorithm Parameters dialog box enables changing the following parameters to improve the algorithm efficiency:

- **Population Size.** The number of potential configurations used during each step of the algorithm. The larger the population, the greater is the probability of finding a good configuration and the more time is required to find this solution.

- **Best population size.** is the parameter is used to artificially preserve the best solutions of the previous generation and protect them from mutations or crossover in case nothing better is produced during the next iteration. This has a ratchet effect that ensures that the GA will generate the desired outcome since any move in the right direction is protected.

- **Number of Generations.** The number of the genetic algorithm's steps. Each generation is equal to the interval during which a new population is created using crossover and mutation. Each new generation is produced by modifying the previous generation with a view to selecting those inputs that produced the best results. The larger the Number of Generations, the bigger the probability of finding a good solution and the more time is required to find this solution. Crossover is the process of creating a new configuration from parts of its parents' configurations.

- **Crossover Probability.** The parameter indicates the probability of crossover for each configuration during any given generation. The higher the crossover rate is, the greater the possibility of convergence with a similar set of children (configurations). A lower crossover rate requires a larger number of generations to explore the search space better. Mutation is the process of altering one ore more parts in the inputs configuration (mask).

- **Mutation Probability.** The parameter specifies the probability of mutation for each configuration of each new generation. The higher the mutation rate is, the better the search possibilities of the algorithm and the greater the possibility of good configurations' being ruined are.

Selecting Additional Stopping Conditions for Genetic Algorithms

This capability can be very helpful when you use Genetic Algorithms as your optimization method. You can use it to prevent excessive use of valuable computer resources. The capability can be configured in the Genetic Algorithms settings (in the *Advanced Optimization Options* dialog box) when you are creating a Neural Model or Strategy.

This capability offers the two following options:

- **Maximum Time … Minutes.** The algorithm will be automatically stopped after an indicated time.

- **No improvement for … Iterations.** The optimization process will be stopped if the fitness of the best model/strategy after improved after a specified number of iterations.

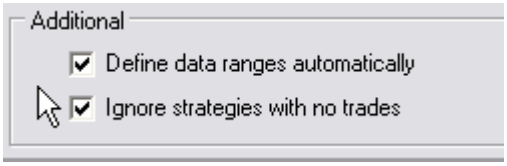
To define the additional stopping conditions for Genetic Algorithms in Strategy Builder:

1. During the Step 3 of the **Optimize Strategy** wizard, click **Advanced**.

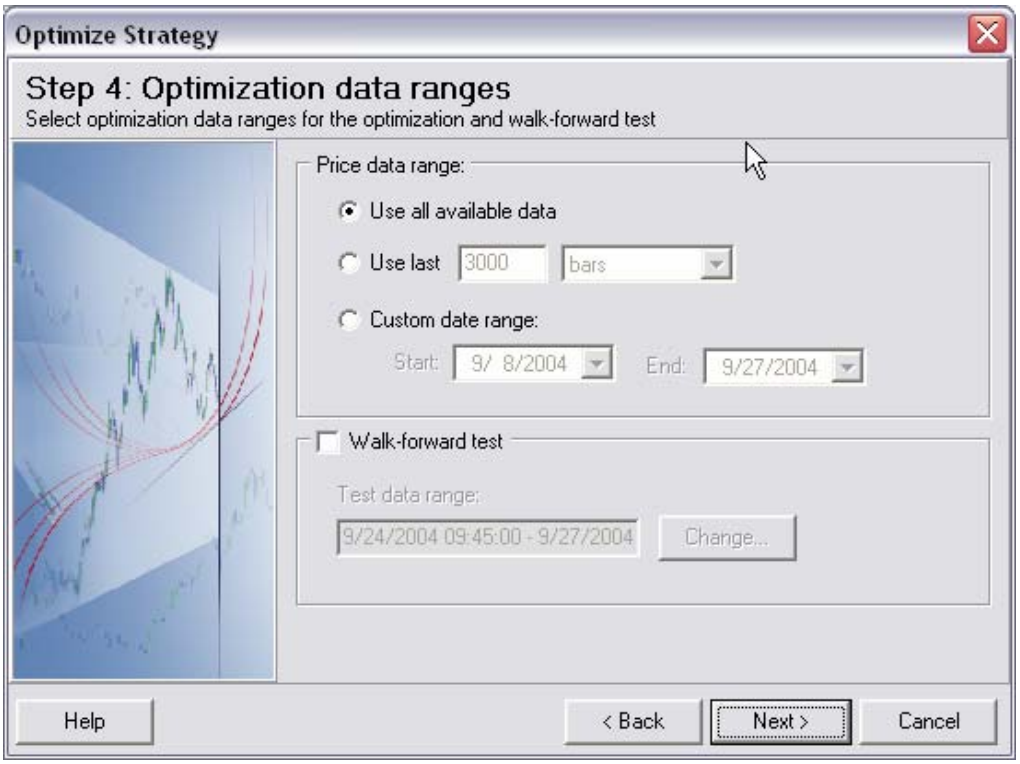
2. In the **Additional Stopping Conditions** area of the *Advanced Optimization Options* dialog box, select the **Maximum Time … Minutes** and/or **No improvement for … Iterations** check boxes and enter the appropriate numbers in the corresponding text boxes.

3. Click **OK**.

To skip Step 4 of the wizard, you can select the **Define data ranges automatically** check box. In this case, the data ranges used for model training and testing will be selected using default settings. By default, 3000 bars will be used for strategy optimization without walk-forward testing.



Step 4: Optimization Data Ranges



During this step, you need to define how much data will be used for strategy optimization. You can also allocate the portion of data to be used for walk-forward testing manually.

To select the amount and position of the price data to be used for model preparation:

1. In the **Price data range** group box, select the **Use last** radio button and enter the amount of data you want to use. The specified amount can be allocated from the end of available price.

2. Select the **Custom date range** radio-button to specify exactly the start and the end date for the data used for model preparation. This option is especially useful if you want to train or test the model on certain price patterns.

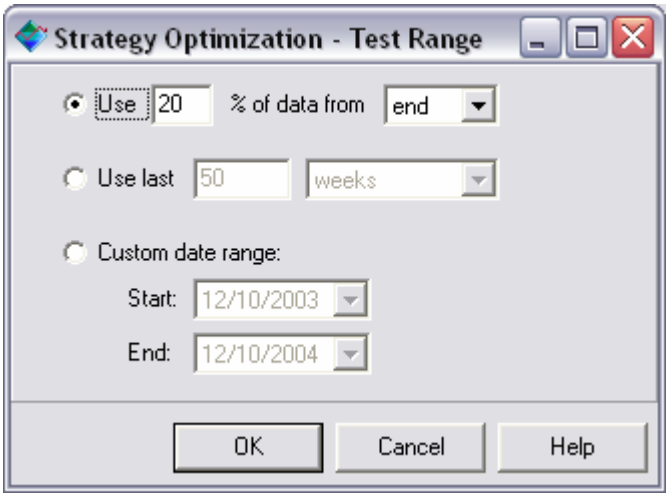
3. Select the **Use all available data** to use all data available for the given security.
The data that will be used for walk-forward testing will be allocated automatically. The allocated range is displayed in the Walk-forward test group box.

***Note**: Although it is not recommended, you can skip the walk-forward testing by clearing the **Walk-forward test** check box.*

To change the amount and position of price data used for model walk-forward testing:

1. In the **Walk-forward test** area, click **Change**.

The *Test Range* dialog box is displayed.



2. In the *Test Range* dialog box, select the **Use % of data from** option to specify the test period as a percentage of the data available for the model's preparation.

Note: *The specified amount can be allocated at the beginning or at the end of the available price data depending on which is selected by you from the corresponding list.*

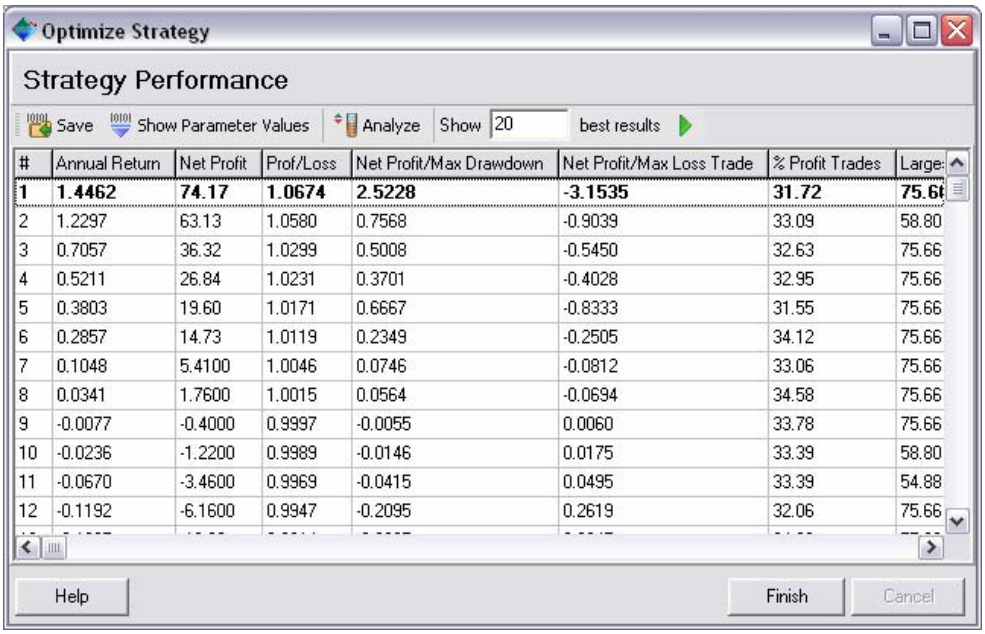
3. Select the **Use last** option to select the test period in bars, years, months or weeks and enter the amount of data you want to use. The specified amount will be allocated from the end of available price.

4. Select the **Custom date range** radio-button to specify exactly the start and the end date for the data used for model preparation. This option is especially useful if you want to train or test the model on certain price patterns.

5. Click **OK**. The walk-forward data range will be re-allocated.

Step 5: Optimization Results

During this step, you can analyze the results of the optimization. The wizard creates a set of reports for each combination of the optimization variables.



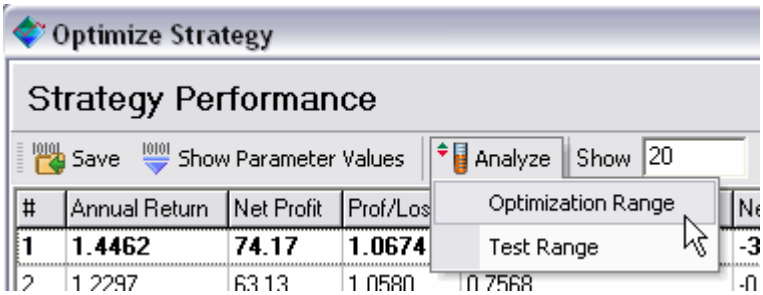
#	Annual Return	Net Profit	Prof/Loss	Net Profit/Max Drawdown	Net Profit/Max Loss Trade	% Profit Trades	Large
1	**1.4462**	**74.17**	**1.0674**	**2.5228**	**-3.1535**	**31.72**	**75.6**
2	1.2297	63.13	1.0580	0.7568	-0.9039	33.09	58.80
3	0.7057	36.32	1.0299	0.5008	-0.5450	32.63	75.66
4	0.5211	26.84	1.0231	0.3701	-0.4028	32.95	75.66
5	0.3803	19.60	1.0171	0.6667	-0.8333	31.55	75.66
6	0.2857	14.73	1.0119	0.2349	-0.2505	34.12	75.66
7	0.1048	5.4100	1.0046	0.0746	-0.0812	33.06	75.66
8	0.0341	1.7600	1.0015	0.0564	-0.0694	34.58	75.66
9	-0.0077	-0.4000	0.9997	-0.0055	0.0060	33.78	75.66
10	-0.0236	-1.2200	0.9989	-0.0146	0.0175	33.39	58.80
11	-0.0670	-3.4600	0.9969	-0.0415	0.0495	33.39	54.88
12	-0.1192	-6.1600	0.9947	-0.2095	0.2619	32.06	75.66

The **Strategy Performance** area shows performance ratios for the most profitable systems found during the test. To sort the table by any of the ratios, click the heading of the corresponding column.
The table is sorted in descending order by the optimization goal specified by you during the previous step. For example, if your optimization goal was Net Profit, the most profitable system will be the first.

By default, the tables contain the top 20 systems. To increase or decrease this number, enter a new value in the **Show best** box at the bottom of the dialog box and click the green triangular button.

To save the selected system as a new strategy with hard-coded values instead of the optimization variables, click **Save**. In the *Strategy* dialog box, enter the name for the new strategy and click **Ok**. The strategy will be saved in Strategy Builder.

To examine the performance of the selected system, click **Analyze**.



The Alyuda system will display the *Strategy Performance* dialog box. In the *Strategy Performance* dialog box, you will be able to view the Strategy

Performance Report, Trades Report and Equity and Drawdown curves, Profit Distribution, MAE/MFE, and Net Profit by Period.

Direct Trade Execution (DTE)

The Direct Trade Execution mode allows making trades on the market automatically. In this mode, the selected strategy sends buy/sell signals to the broker. All the sent signals are stored into Trading History.

How DTE Works

When the DTE mode is activated, the streaming mode is automatically activated.

***Note**: The streaming mode is activated automatically when DTE is activated.*

For DTE samples to work, as well as installing TraderWorkstation (Interactive Brokers), it is necessary to install the Active X components that are installed separately..

DTE Mode for Several Symbols and Several Strategies

The initial account, commission, slippage and margin data in the DTE mode are taken from the broker. That is why while testing a strategy or while working with the broker, the strategy signals may differ if the values of these parameters don't coincide. Pay attention to the Money Management parameters in Tradecision when working in the DTE mode.

The DTE mode of Tradecision does not guarantee the correct performance of strategies if DTE is activated for several strategies and symbols simultaneously. This is connected with the specifics of the initial account functionality in Money Management (each strategy has its own initial account).

Activating the DTE Mode

The DTE mode can be activated in the four following ways.

To start the regular DTE mode:

1. On the main Tradecision menu, click the **Direct Trade Execution** icon**,**

–OR-

Select **Tools> Direct Trade Execution.**

To start the DTE mode for the last-used strategy:

1. On the main Tradecision menu, click the **DTE With Last Strategy** icon**,**

–OR-

Select **Tools> DTE With Last Strategy.**

To start the DTE mode for the last-used strategy:

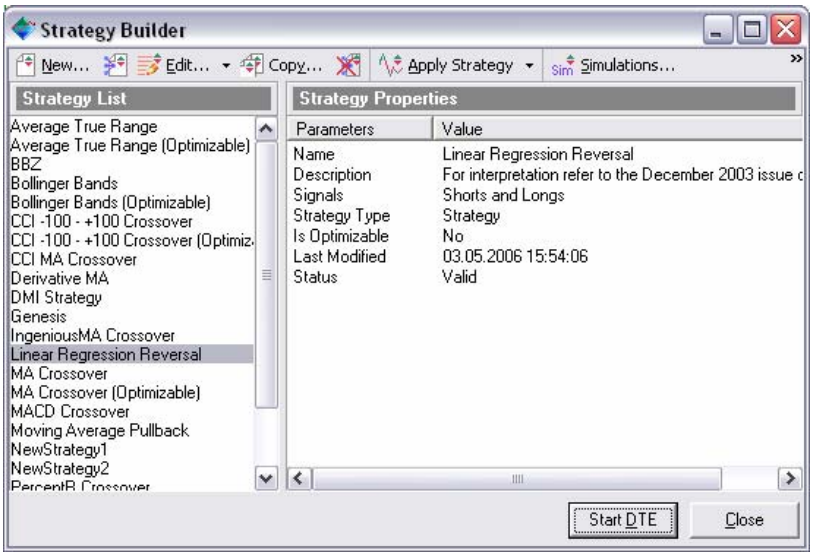
1. On the main Tradecision menu, click the **DTE With Current Strategy** icon**,**

–OR-

Select **Tools> DTE With Current Strategy.**

To start the DTE mode for the selected strategy:

1. At the bottom of the Strategy Builder window, click **Start DTE**.


Strategy Builder
New...
Edit...
Copy...
Apply Strategy
Simulations...
Strategy List
Average True Range
Average True Range (Optimizable)
BBZ
Bollinger Bands
Bollinger Bands (Optimizable)
CCI -100 - +100 Crossover
CCI -100 - +100 Crossover (Optimiz
CCI MA Crossover
Derivative MA
DMI Strategy
Genesis
IngeniousMA Crossover
Linear Regression Reversal
MA Crossover
MA Crossover (Optimizable)
MACD Crossover
Moving Average Pullback
NewStrategy1
NewStrategy2
Strategy Properties
Parameters
Value
Name
Linear Regression Reversal
Description
For interpretation refer to the December 2003 issue
Signals
Shorts and Longs
Strategy Type
Strategy
Is Optimizable
No
Last Modified
03.05.2006 15:54:06
Status
Valid
Start DTE
Close

Trading Toolbar

The system supports making trades manually. This is done using the trading toolbar at the bottom of the main Tradecision window.

To buy or sell manually:

1. From the Action list on the trading toolbar at the bottom of the main Tradecision window, select buy or sell;

2. In the Position box, enter the required amount and click **Send Order**.

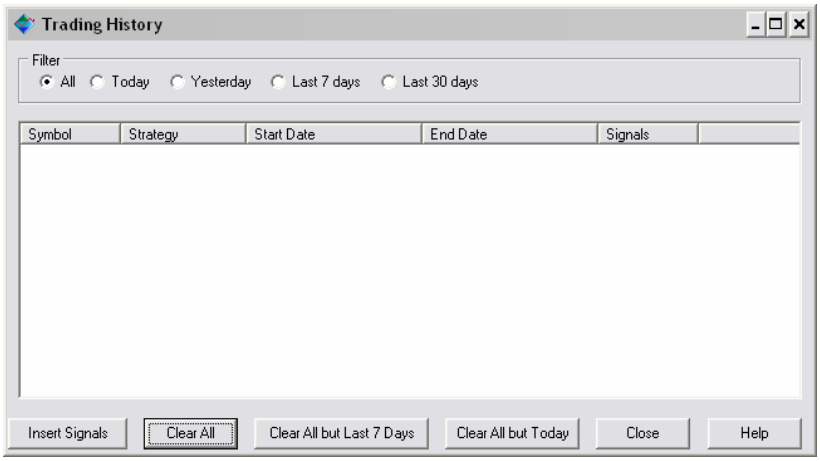
An order with the defined parameters will be sent to the broker.

Trading History

The user can view the results of the past trades.

To view the results of the past trades:

1. From the main Tradecision window, select **Tools>Trading History**.



The *Trading History* window is displayed.

DTE work sessions are displayed in the *TradingHistory* window. For each of the sessions, the start time, end time, the name of the symbol, the name of the strategy and the number of the generated signals are displayed.

2. To display the DTE sessions for a certain period of time, in the Filter area at the top of the trading History window, select the relevant period:

- **All**
- **Today**
- **Yesterday**

- **Last 7 days**
- **Last 30 days**

The sessions that meet the selected period are displayed.

Note**: The signals in the displayed session can be inserted into a chart. To insert signals into a chart, select the required session and click* ***Insert Signals.

DTE Mode Settings

The DTE mode settings are located in the **Trading** tab of the *Preferences* window.

Select Broker. Sets the broker that handles the trade.
Confirm Trading Orders. Requests user confirmation before each transaction.
Closing all positions on stop trading. Closes all open positions when the DTE mode is deactivated.

Interactive Brokers Settings

The Interactive Brokers settings are located in the **Interactive Brokers** tab of the *Preferences* windows.

Address. The address of the computer on which Interactive Brokers is run; if Interactive Brokers is run on the same computer with Tradecision, this box can be left empty

Post. The port number.

ClientID. The numeric identifier of the customer. This parameter and the parameter that performs its function in Data Manager must be different for the application's correct work.

Money Management

Money management is the most important part of successful trading and Tradecision gives it the topmost priority.

Understanding Money Management

When you are setting up a trade, it is essential to predetermine the amount of risk you are incidentally willing to take.

This means that you have to be able to control your position size, stop loss and profit target yet before you enter the market! That is why, the conditions for closing out (exiting) a trade are a lot more important than the entry conditions.

Taking the right approach to money management, never results in losing one's account.

For your convenience, the most popular money management rules are predefined and easily accessible through an advanced point-and-click editor. The editor enables the following types of money-management operations:

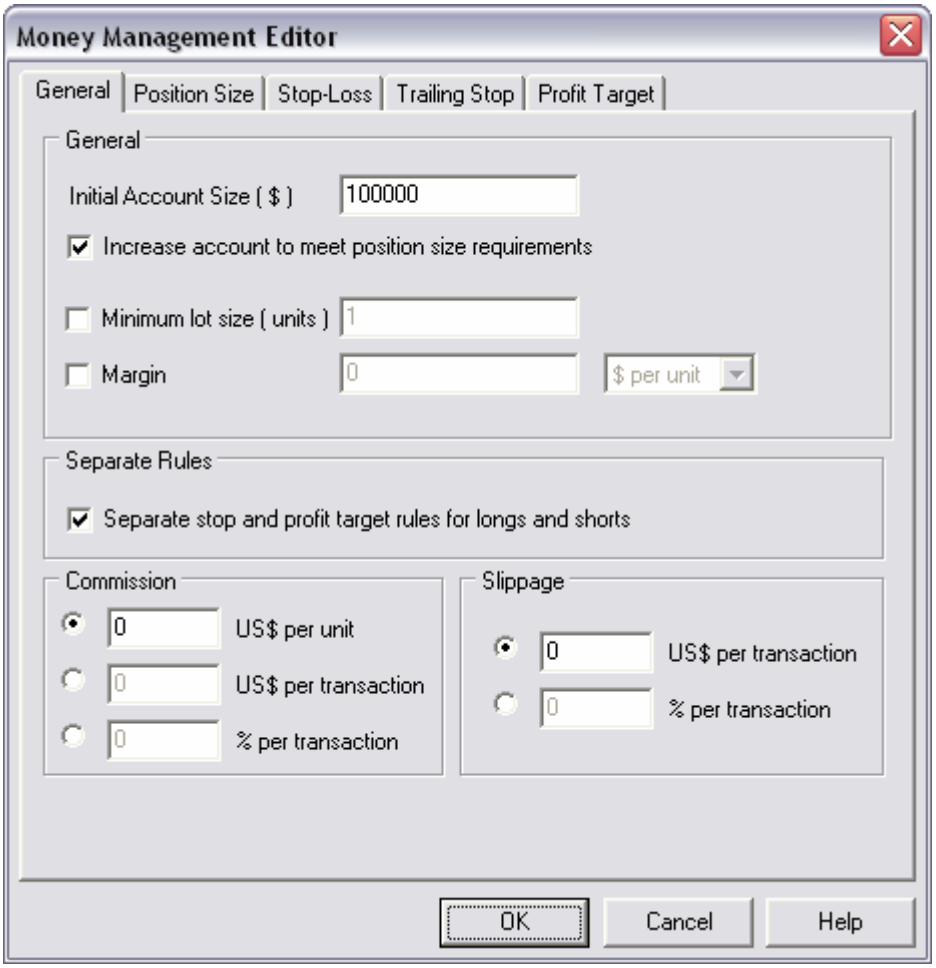
- Automatic calculation of the position size using Optimal F, Kelly, Fixed Fractional Trades and William formulas;
- Easy application of several stop-loss rules which only requires a couple of clicks;
- Easy definition of the trailing stop rule as a combination of predefined conditions;
- The system also supports using a predefined Profit Target and defining a custom Position size formula

  To test your money management rules, you can define them in Improvian, a full-featured programming language. The New Strategy dialog box provides special features for entering and editing your stop-loss, trailing stop, and profit target rules. The same rules can cover long and short trades, or you can also create separate rules for this purpose.

Money Management Editor

Money Management Editor will allow you to use and customize the most well-know stop-loss, trailing stop and profit target rules without the need to encode them using the Improvian language. Money Management Editor will enable you to define your position size and trade execution options, such as position size, commission, slippage and margin.

General



In the **Initial capital** box, you can enter the amount of the starting capital that has been selected for testing the current system.

Select the **Increase account to meet position size requirements** check box, if you want to proceed with strategy simulation even if your initial account is not sufficient to enter a position with the required position size. Clear this check box to automatically decrease the position size according to the amount of money left in the account.

In the **Minimum lot size** box, you can enter the minimum number of contracts/shares that must comprise the transaction.

If you buy or sell on leverage, and you want the system to be tested taking into consideration the margin requirements, you need to specify the **Margin** parameter.

It is specified in USD per unit (contract) or as percentage per unit (the same as % per transaction). When trading on margin, you must make a good faith deposit called a margin, as well as have enough funds in your account to pay off all equity drawdowns. The Margin is the dollar amount that you pay as margin for each contract. The Margin can also be specified as a percentage of the account amount that you need to deposit to purchase securities on credit.

Select the **Separate stop and profit target rules for longs and chorts** check box to define separate stop-loss, trailing stop and profit target rules for longs and shorts.

Commission

Commission is the amount you pay your broker per unit (share/contract) or transaction. You can specify commission as a dollar amount per unit, or as percentage or dollar amount per transaction.

Tradecision charges the commission once per transaction (an entry/exit combination).

You can define the commission as a dollar amount per unit only if your position size is defined in units. In this case, Tradecision multiplies the position size (in units) by the commission per unit to derive the commission for a transaction.

For stocks, we recommend that you opt for the commission-per-transaction option and enter the total commission amount that your broker charges for both entering and exiting the market. For futures, we recommend that you use the commission-per-unit option and enter the commission amount for a single futures contract.

Slippage

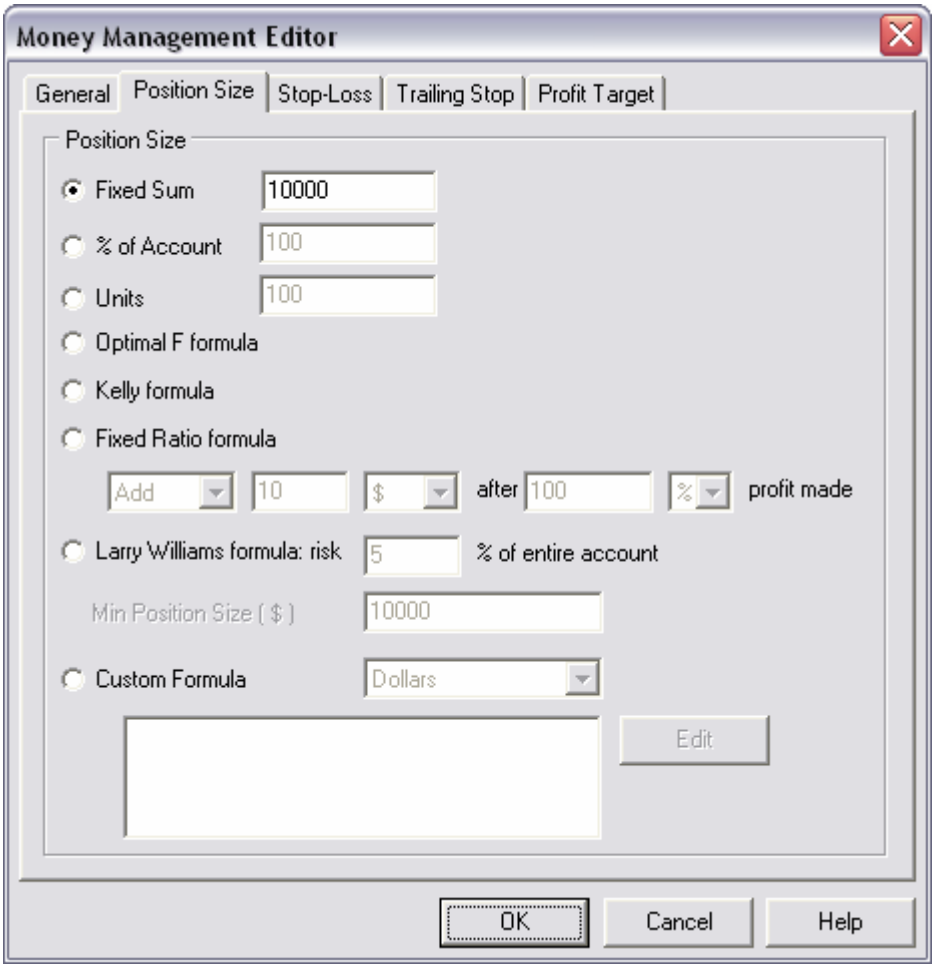
Slippage is the difference between the price specified by the criteria of your strategy (the estimated price during a trading simulation) and the actual trading price you pay. The difference can be caused by slowness of your broker who may not be able to fill your order at the desired price.

Tradecision records all trades using the price specified by the criteria of your trading strategy. To simulate the effect of negative slippage, Tradecision can adjust the profit and loss figures using the slippage parameter.

You can specify slippage as a dollar amount per unit, as percentage or as a dollar amount per transaction. Tradecision charges the slippage amount once fper transaction (an entry/exit combination).

You can define the slippage as a dollar amount per unit only if your Position size is defined in units. In this case, Tradecision multiplies the position size (in units) by the slippage amount per unit to derive the slippage for a transaction.

Position Size



The Position size settings are used to define how many units (shares/contracts) are to be traded for each transaction.

You can specify the **Position size** in units, dollars or as percentage of the available equity (initial capital). You can also opt to calculate the position size dynamically using one of the four available formulas.

For stocks, we recommend that you opt for the the position- size-in-dollar-amount option and enter the dollar amount per transaction.

For futures, we recommend that you define the position size in units and enter the number of contracts per transaction.

If you want to trade depending on the available equity without investing more or picking up your profits, specify the position size as percentage of the available equity. For example, to invest the whole of the available account you can select 100%. Using this option, if you make or lose some amount on a transaction, the position size of your next position will be bigger or smaller for the made or lost amount.

The following formulas are available for the dynamic calculation of position size:

The **Optimal F formula**. This method of estimating the optimal risk percentage has been improved by Raplh Vince. While Kelly's formula uses only the average values from the past trades, Raplh Vince proposed to take into account all the trades, solving the task of optimizing the relative end capital TWR as a function of f.

The **Kelly formula** defines the optimal percentage of risk that should be allowed to maximize the "usefulness" function presented as a logarithm of the capital.

The **Fixed Ratio formula**. A common shortcoming of all those methods that use a fixed fraction of the capital is that they either maximize the capital growth without relation to risk (i.e., the optimal f) or minimize the risk (i.e., no more than x% of the capital is risked). Trying to solve this conflict, Ryan Jones concludes that the relation of the number of lots traded to the capital growth required to increase the number of lots by one (or the minimal increment) should be a constant.

Larry Williams formula. Larry Williams formula is a variation of the fixed ratio method recommended by Larry Williams. The position size in units/lots is calculated as:

% risk * Capital / (- Max_Drawdown) / 100.

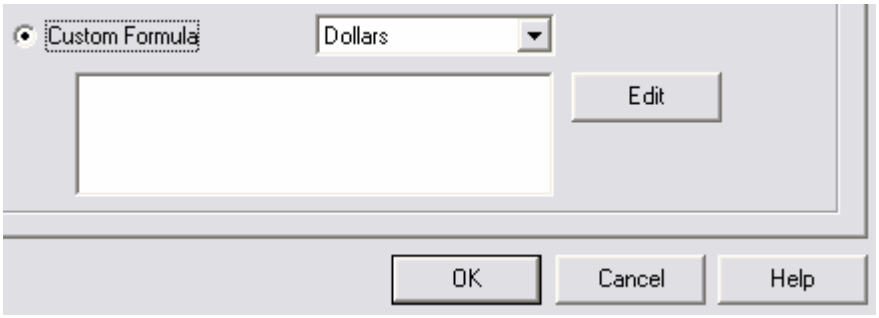
The last free formulas require a minimum position size for their calculation. You can enter it in the **Minimum position size** box. If the Position size amount is not enough to buy at least one share/contract, Tradecision will not generate any trades.

Using Custom Formula for Position Size

You can define your own formula for Position Size.

To write a custom formula for Position Size:

1. In the *Position Size* tab of the *Money Management* dialog box, select the **Custom Formula** option.



2. From the list, select the **Dollars, % of Account** or **Units**.

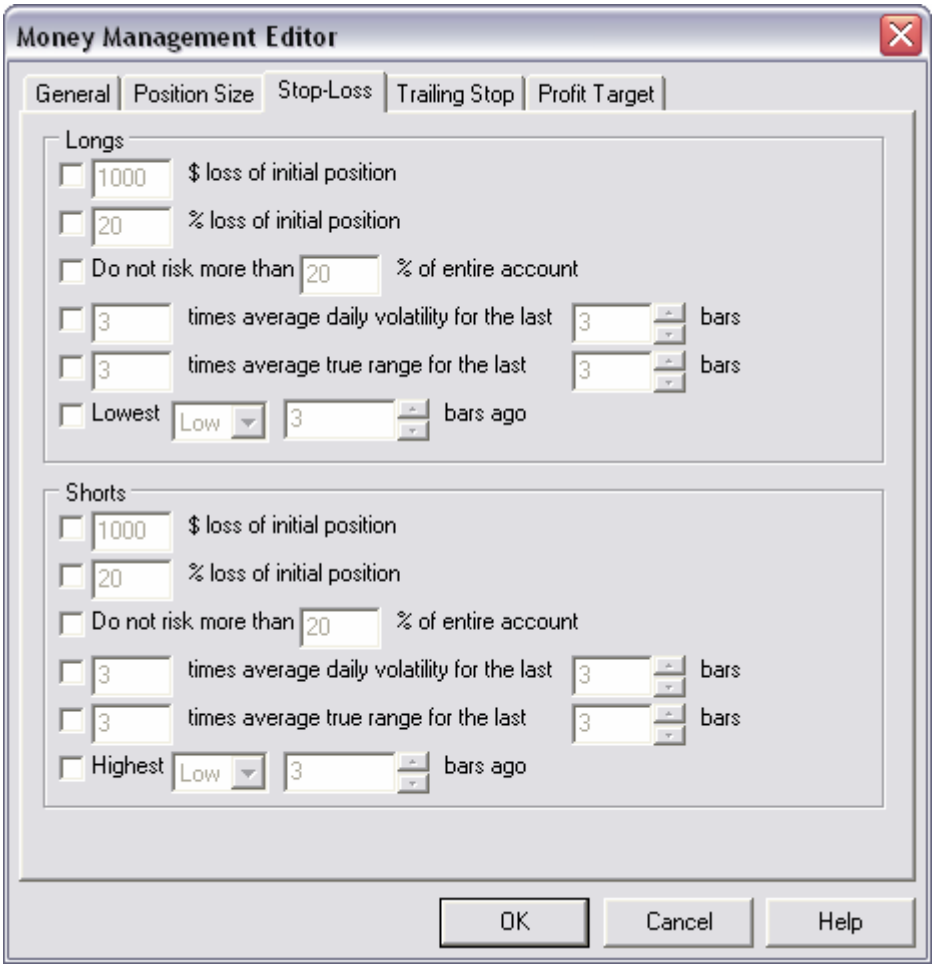
3. Click **Edit**.

The *Improvian Editor* dialog will be displayed.

4. Write an expression and click **OK**.

5. In the *Money Management* dialog box, click **OK**.

Stop Loss

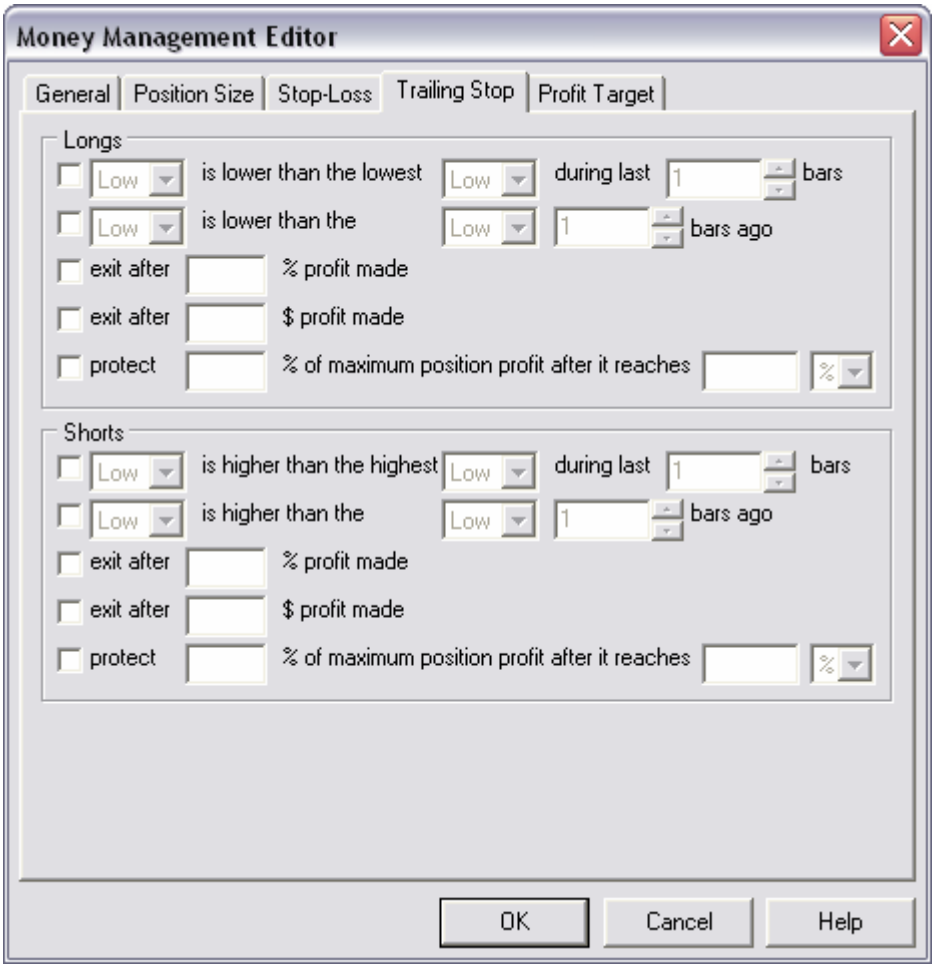


The Stop Loss parameters are used to easily define a combination of stop-loss rules. To select a rule, select the corresponding check box and define the rule parameters.

All rules are combined using the logical OR. In other words, an exit signal will be generated if any of the conditions are met.

Trailing Stop

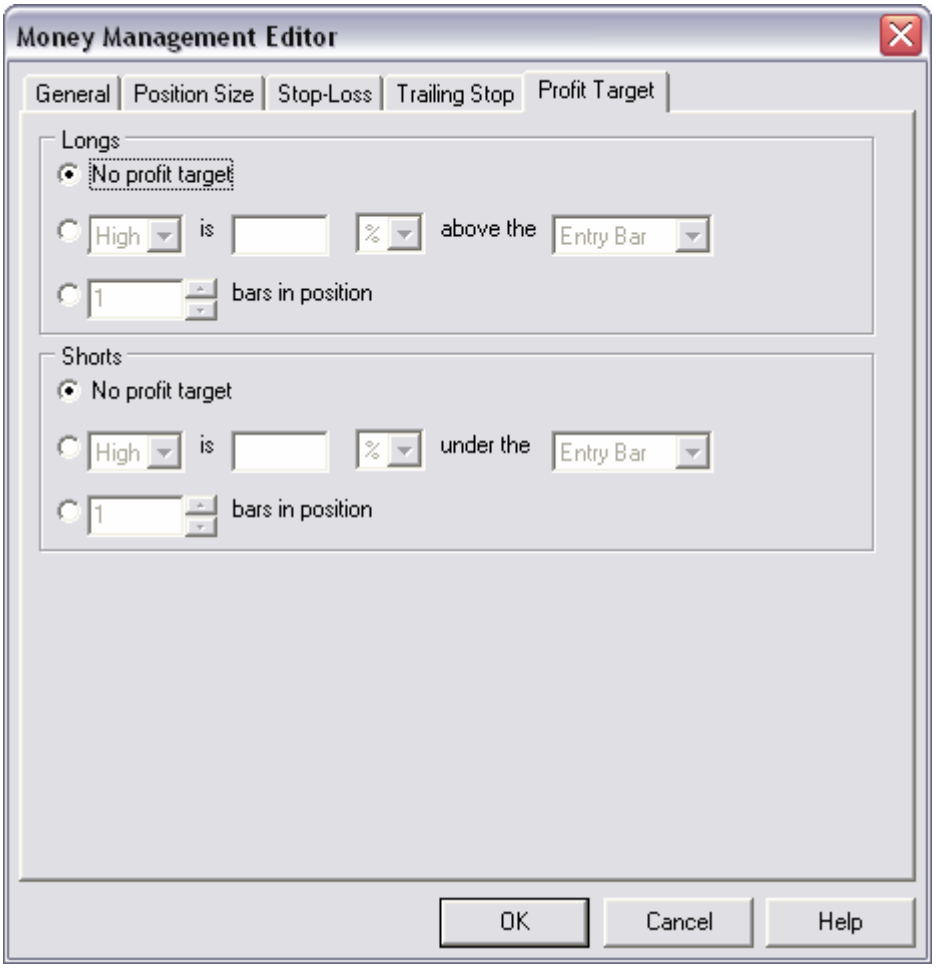
The Trailing Stop parameters are used to easily define a combination of trailing stop rules. To select a rule, select the corresponding checkbox and define the rule parameters.



All rules are combined using the logical OR. In other words an exit signal will be generated if any of the conditions are met.

Profit Target

The Profit Target parameters are used to easily define a profit target rule. To select a rule, select the corresponding option and define the rule parameters. You can select only one profit target rule.



Chapter 15

Simulation Manager

Simulation Manager enables easily creating, running and storing any number of simulations. Simulations are stored into an express simulations list that can be quickly categorized or filtered. Any stored simulation can be inserted into a chart or analyzed with one click.

Understanding Simulations

Strategy analysis is a vital stage of the strategy development process. When you insert your strategy into an active chart, a new simulation is automatically created and all performance reports are generated and stored in the Simulations Manager. This is the fastest way to simulate and analyze a strategy.

Tradecision provides advanced simulation capabilities, specifically designed to help professional traders easily identify the advantages and disadvantages of a strategy.

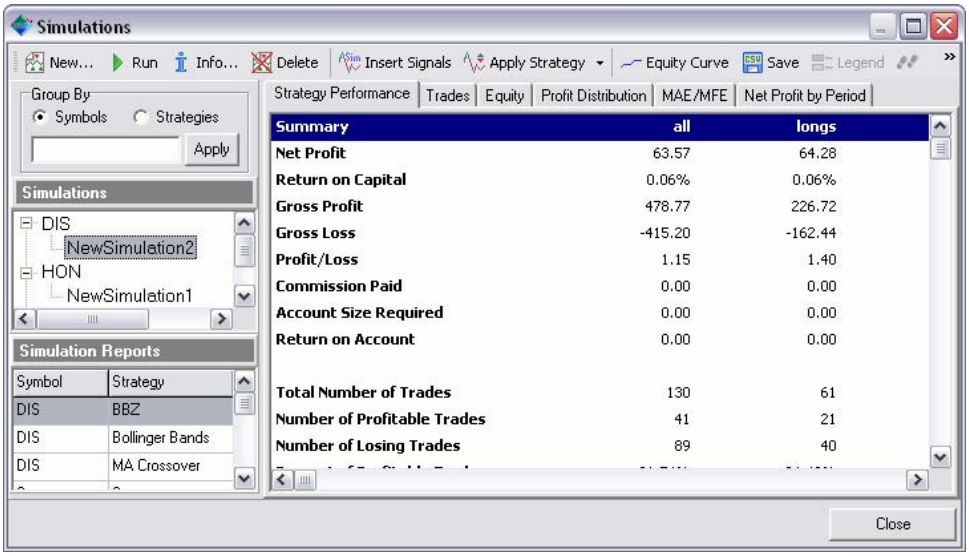
With the New Simulation wizard, you can simulate one strategy with different symbols concurrently. Moreover, within one run of just one simulation you can back-test several strategies with one symbol. In both cases, you can easily compare the results. All this means that your strategy analysis will be a lot more efficient.

Working with Simulation Manager

Tradecision **Simulation Manager** allows you to create and manage strategy simulations. You can create, run, insert into a chart, delete and thoroughly analyze a simulation.

To access Simulation Manager:

1. From the **Tools** menu, select **Simulation Manager**.



Simulation Manager can also be launched by clicking the tool button on the main Tradecision toolbar.

The **Simulations** dialog box contains a toolbar with commands, a list of your simulations, a list of the available reports for each simulation and the performance reports pane, displaying a selected report.

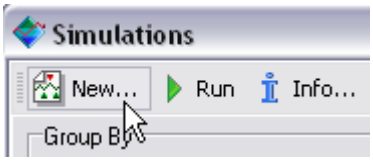
To work with a simulation, select it in the simulations list and click the appropriate toolbar button.

Creating a New simulation (the New Simulation wizard)

The New Simulation wizard will guide you through the process of creating a new simulation.

Starting the New Simulation wizard:

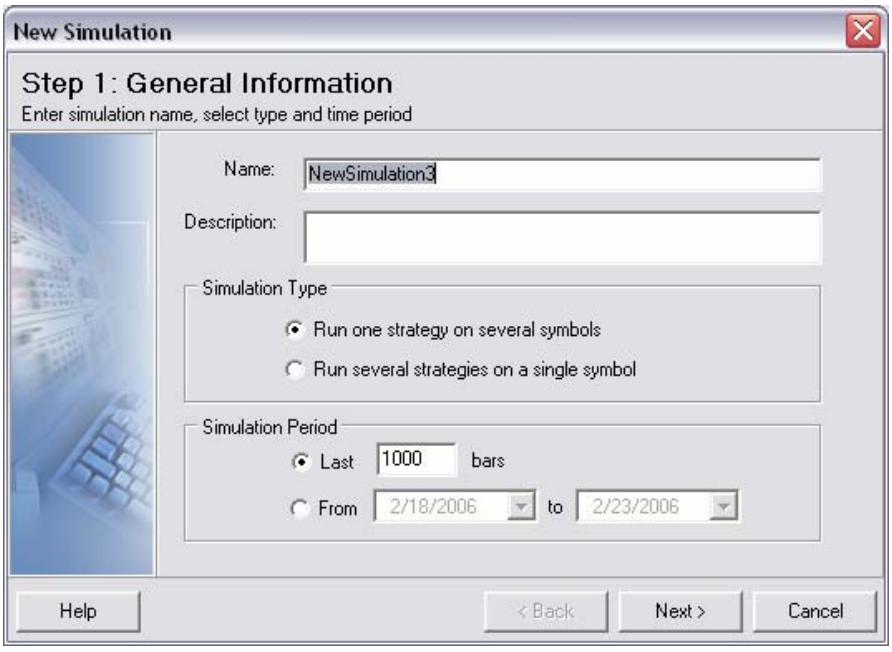
To start the wizard in **Simulation Manager**, click **New**.



The wizard has three steps:

Step 1: General Information
Step 2: Symbols
Step 3: Strategies

Step 1: General Information



During step you need to define the name of the simulation, its type the period of time it will span and provide a description of the simulation.

In the **Name** box, you can change the automatically generated model name to a more descriptive one. The name of the simulation must be unique among those of the stored simulations.

In the **Description** box, you can enter a description of this simulation that will later help you distinguish this simulation from similar ones created for the same stock or strategy.

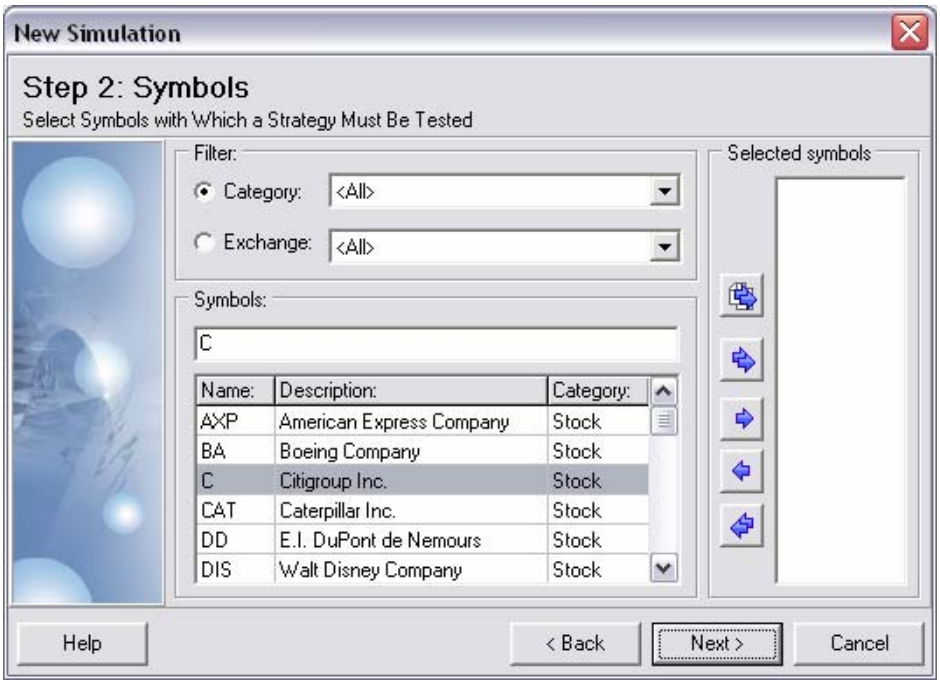
In the **Simulation Type** area, you can select the **Run one strategy on several symbols** option if you want to run the strategy simulation on one or several stocks or the **Run several strategies on single symbol** option if you want to run one strategy with several stocks.

In the **Simulation Period** area, you can define how much data will be used for the simulation.

Select the **Last** option to define the simulation period in bars. Enter the amount of data that you want to use in the box. The specified amount can be allocated from the end of the available price data.

Select the **From** option to specify exactly the start and the end date of the simulation period. This option is especially useful if you want to test a strategy on specific price patterns.

Step 2: Symbols



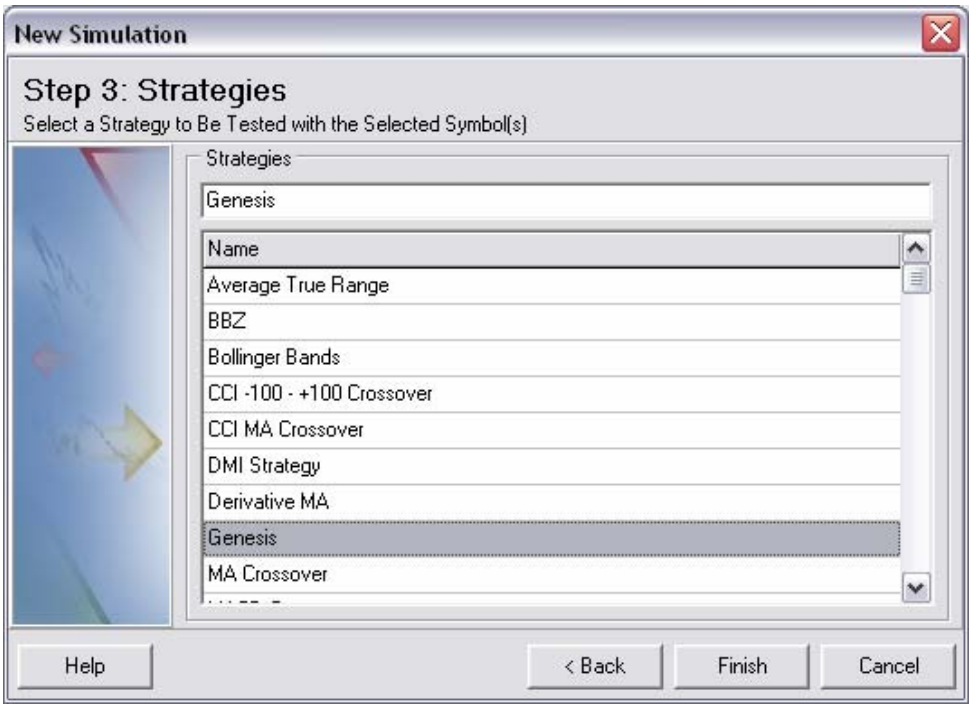
During this step, you need to select a symbol or symbols for the simulation.

If during the previous step you selected the **Run one strategy on several symbols** option, you can select one or several symbols using the **blue arrow buttons**. The selected symbols will appear in the **Selected symbols** area.

If during the previous step you selected the **Run several strategies on a single symbol** option, you can select only one symbol with a mouse click or using arrow keys of the keyboard. Alternatively, you can type the name of the symbol in the **Symbols** box.

While selecting symbols, you can sort the **Symbols** table by name, description or category by right-clicking the column captions. You can also use the filtering functionality in the **Filter** area to display only those symbols that belong to the selected category or exchange.

Step 3: Strategies

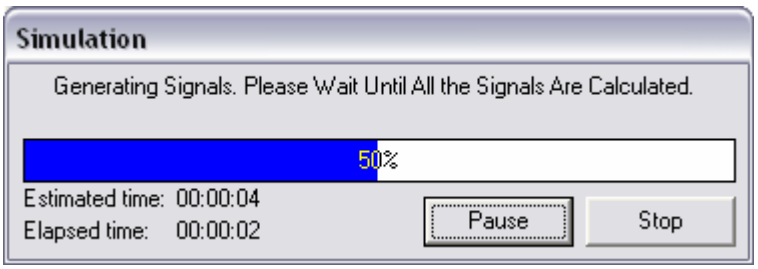


During this step, you need to select a strategy or strategies for the simulation.

If during the Step 1 you selected the **Run one strategy on several symbols** option, you can select only one strategy with a mouse click or using the arrow keys of the keyboard. Alternatively, you can type the name of the strategy in the **Strategies** edit box.

If during the previous step you selected the **Run several strategies on a single symbol** option, you can select one or several strategies using the **blue arrow buttons**. The selected symbols will appear in the **Selected strategies** area.

To finish the process, click **Finish**.



The new simulation will be added to your simulations list. The following message will be displayed.

To analyze a simulation:

1. From the **Simulations** pane in the *Simulations* dialog box, select a simulation that you want to analyze.

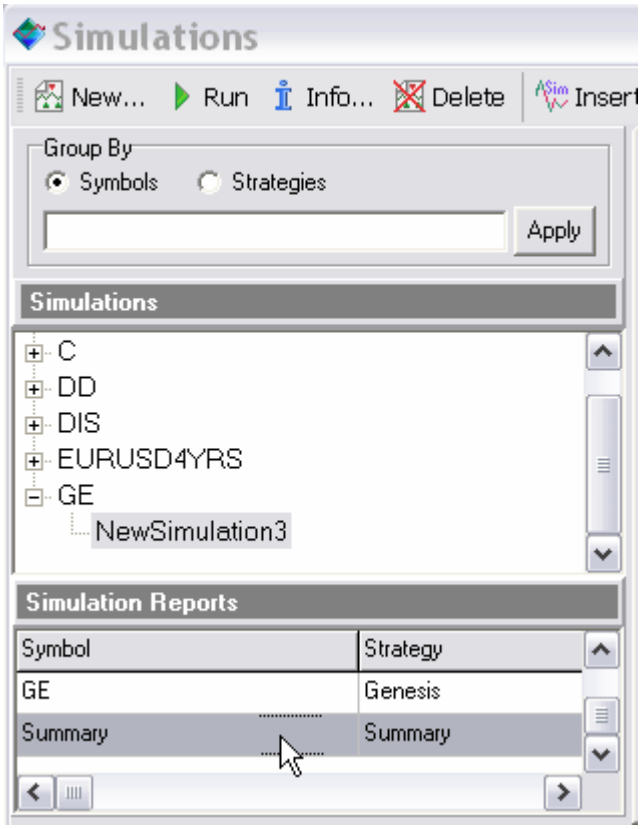
2. If the simulation contains several symbols or strategies, select the appropriate report from the **Simulation Reports** list.

3. View **Strategy Performance, Trades**, **Equity, Profit Distribution, MAE/MFE** or **Net Profit by Period** tabs by selecting them on the toolbar to analyze the simulation.

When you are testing a system against a group of stocks, you can view the overall system performance against all the stocks. Consequently, you will know the total number of trades and winners against the entire basket of stocks to which your trading system has been applied.

To analyze a Summary Report:

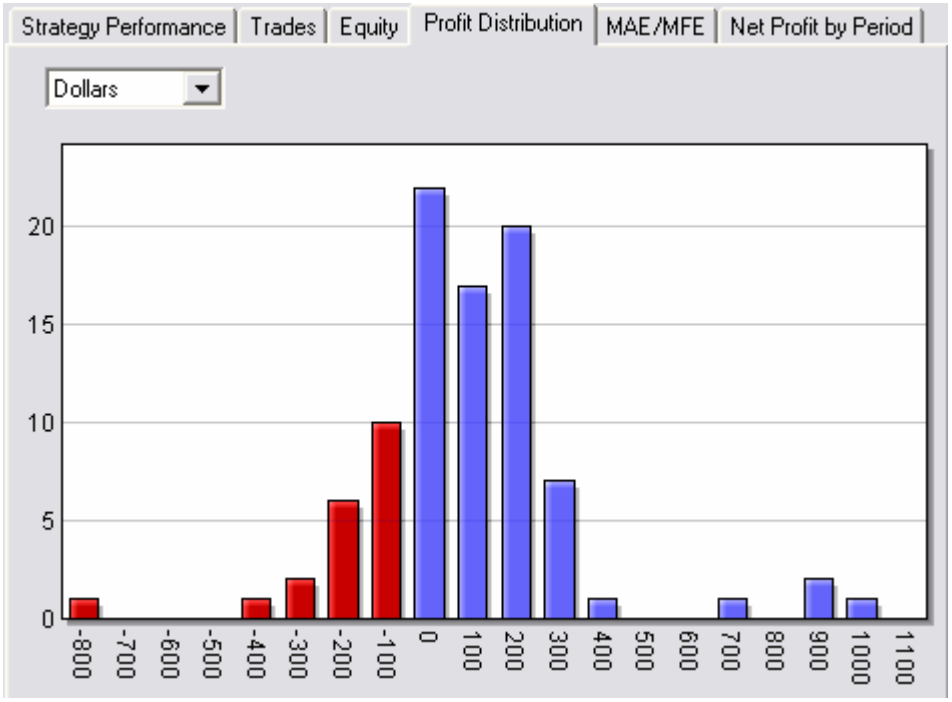
1. After you have run a simulation, in the **Simulation** area, select a simulation and then select **Summary** in the **Simulation Reports** area. .



To analyze Profit Distribution:

1. In the *Simulations* dialog box, select a simulation and then go to the *Profit Distribution* tab.

2. From the list the upper left corner of the *Simulations* dialog box, select **Dollars** or **Percentage**.



MAE/MFE

Maximum Favorable Excursion (MFE), a theory created by J. Sweeney to evaluate the distinctive characteristics of profitable trades, can be used to determine the greatest profit a trade had brought in before it closed. Analyzing the performance of a trading system allows us to measure the tendency of of the trades' MFE.

MFE can be used as part of your analytical process to allow traders to differentiate between average trades and those that have substantially greater profit potential. Using MFE, analysis traders can categorize above-average performance during a trade and thus identify new opportunities to enhance profitability using the MFE risk management strategy.

Maximum Adverse Excursion (MAE) indicates the greatest loss a trade caused before it closed. The MAE is statistical data provided as a result of backtesting of a trading system.

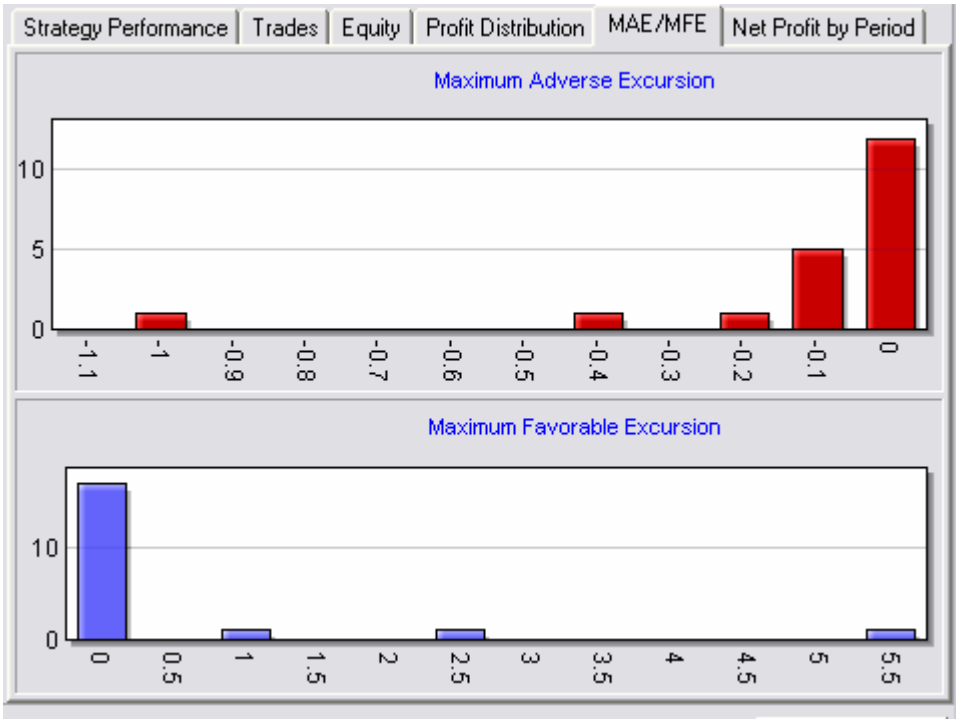
Although a trading system may seem practical, a particularly large MAE may signal that it would not, actually, work in practice because the MAE will be too big for the proposed account size, perhaps eliciting a margin call that will render the back-test results inaccurate and misleading.

Analyzing MFE and MAE

Analytical MFE and MAE information on a simulation can be analyzed in the *MAE/MFE* tab of the *Simulations* dialog box.

To analyze Maximum Favorable Excursion (MFE) and Maximum Adverse Excursion (MAE):

1. In the *Simulations* dialog box, select a simulation and then select the *MAE/MFE* tab.



Analyzing MAE/MFE graphs:

X-axis shows MAE/MFE values.
Y-axis shows a number of trades for every MAE/MFE.

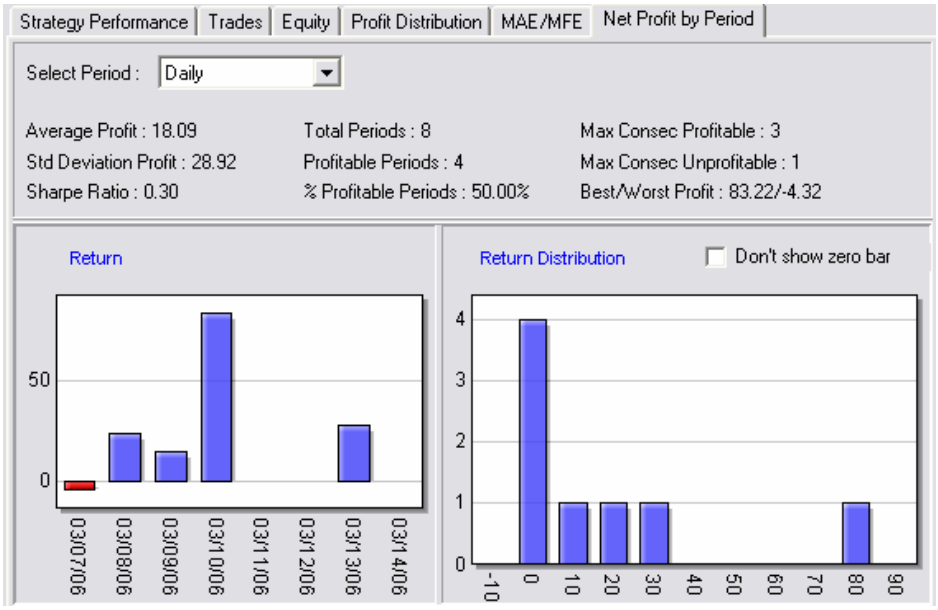
To analyze net profit by period:

1. In the *Simulations* dialog box, select a simulation and select the *Net Profit by Period* tab.

2. To define the period for which the profit is evaluated, from the **Select Period** list, select the appropriate value. The following options are available:

- **Hourly**
- **Daily**
- **Weekly**
- **Monthly**
- **Quarterly**.
- **Annually**

The *Net Profit by Period* tab displays the required information in two separate charts: **Return** and **Return Distribution**.



The **Return** chart – shows Net Profit for each period. The number of columns is equal to the number of periods in the overall period of time the simulation has spanned. The blue color means positive profit and the red color means negative profit. The date/time is along the X axis; Net Profit is along the Y axis.

The **Return Distribution** chart - shows profit distribution, i.e. the number of deals that have yielded some profit. The bar with the "0" index shows the number of deals with Profit from 0 to 100. This bar can be hidden by selecting the **Don't show zero bar** Check-box. The blue color means positive profit and the red color means negative profit. The size of

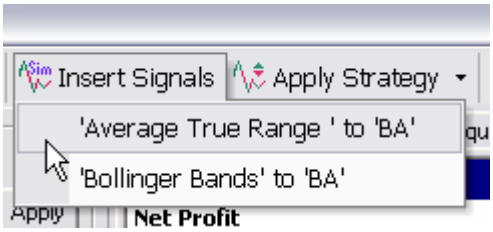
the profit is along the X axis; the number of deals that correspond to this profit is along the Y axis.

Inserting Simulation Signals into a Chart

To insert simulation signals into a chart:

1. From the **Simulations** pane in the *Simulations* dialog box, select the simulation that you want to insert into a chart.

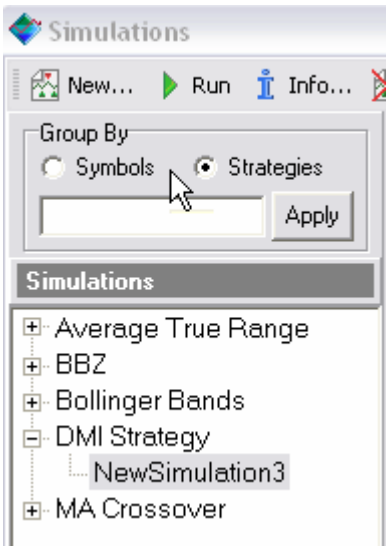
2. In the toolbar, click **Insert Signals** and select the strategy and chart into which you want to insert the signals.



Grouping and Filtering Simulations

To group or filter simulations in the Simulations pane:

1. In the **Group by** area, select the **Symbol** or **Strategies** option to group simulations by symbol or by strategy.



2. Additionally, you can type one or several characters in the box to show only those symbols and strategies whose names contain the specified characters.

3. Click **Apply** to apply the defined filter.

Viewing simulation Information

To view simulation parameters:

1. On the Simulations Manager toolbar**,** click the **Info** button.

The following parameters will be displayed:
Name, **Description**, **Simulation Period**, **Date/Time Created**, **Date/Time Last Run**, **Simulation Symbols** and **Strategies**.

***Note**: The displayed parameters cannot be edited.*

2. Click **Close**.

Running Simulation

To run a simulation on a chart:

1. In the **Simulations** pane select the simulation that you want to run.

2. On the toolbar, click **Run**. A message box will be displayed upon completion.

3. Click **OK**.

Now you can analyze the simulation. Also see Analyzing Simulation.

Deleting a Simulation

To delete a simulation:

1. In the **Simulations** pane, select the simulation that you want to remove.

2. Click **Delete**.

The simulation will be deleted.

Saving Simulation Reports in the CSV (Excel) format.

You can save a Strategy Performance Report and Trades Report on a specific simulation to further analyze the figures in Excel or some other 3rd party software.

To save the simulation reports as.csv file:

1. In the *Simulations* dialog box, select a simulation the reports on which you want to export.

2. Click **Save as CSV** and then select **Reports**.

The corresponding Strategy Performance Report and Trades Report will be saved to the Tradecision catalog of the **CSV Reports** folder on your local hard drive.

Saving Strategy Signals in the CSV (Excel) Format

You can save strategy signals in a separate file to export them to a 3rd party software or use them as a custom time-series.

To save the simulation (strategy) signals as.csv file:

1. In the *Simulations* dialog box, select a simulation whose signals you want to export.

2. Click **Save as CSV** and then select **Strategy Signals**.

The strategy signals will be saved to the Tradecision catalog of the **Reports** folder on your local hard drive

Note: *The CSV file will contain three columns: date, simulation signal as a text, and simulation signal as a numeric identifier.*

The Equity Curve Indicator

Understanding Equity Curve

The equity curve is an essential factor to be considered before making a trade decision. It shows — in the graph form — how much you would have profited or lost with a specific trading system, and how occasional and/or stable your wins have been.

A smooth, even upward curve is ideal. It indicates that the current characteristics of a stock are in keeping with the applied system.

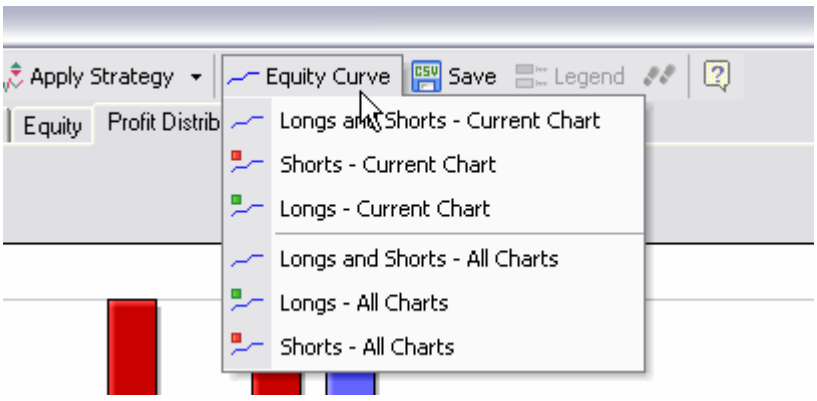
Plotting Equity Curve on a Chart

Simulation Manager enables plotting Equity Curve as an indicator on a chart.

To place Equity Curve on a chart:

1. From the **Tools** menu, select **Simulation Manager** and then click **Equity Curve**.

2. From the short-cut menu, you can select **Longs and Shorts – Current Chart, Longs – Current Chart, Shorts – Current Chart** (or the same for all charts), depending on which one you want to place on a chart as indicator.



Analyzing Strategy Performance

Simulation Manager is a powerful report generator that allows you to gain insight into your trading strategies.

Strategy Performance Report

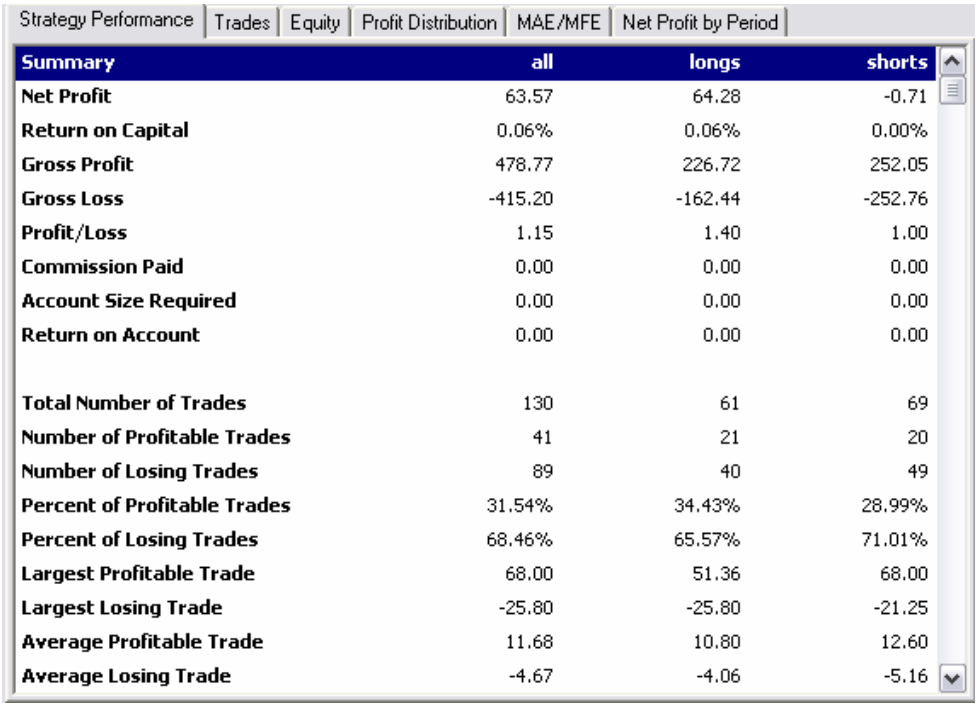
The Strategy Performance Report helps you in analyzing your strategies and estimating their suitability to your trading style and risk preferences. The report provides over 100 performance parameters you can use to analyze a strategy.

The Performance Report contains the following seven sections:

- Summary;
- Trades;
- Return;
- Risk;
- Drawdown and Run-up;
- Outlier Trades;
- Time Analysis.

Summary

Detailed statistical information on a summary can be viewed in the *Strategy Performance* tab of the Strategy Performance Report.



Strategy Performance | Trades | Equity | Profit Distribution | MAE/MFE | Net Profit by Period

Summary	all	longs	shorts
Net Profit	63.57	64.28	-0.71
Return on Capital	0.06%	0.06%	0.00%
Gross Profit	478.77	226.72	252.05
Gross Loss	-415.20	-162.44	-252.76
Profit/Loss	1.15	1.40	1.00
Commission Paid	0.00	0.00	0.00
Account Size Required	0.00	0.00	0.00
Return on Account	0.00	0.00	0.00
Total Number of Trades	130	61	69
Number of Profitable Trades	41	21	20
Number of Losing Trades	89	40	49
Percent of Profitable Trades	31.54%	34.43%	28.99%
Percent of Losing Trades	68.46%	65.57%	71.01%
Largest Profitable Trade	68.00	51.36	68.00
Largest Losing Trade	-25.80	-25.80	-21.25
Average Profitable Trade	11.68	10.80	12.60
Average Losing Trade	-4.67	-4.06	-5.16

- **Net Profit**. The amount of money that was made or lost trading based on the selected strategy.
- **Return on Initial Capital**. A percentage of the profit or loss the system generated based on its initial equity.
- **Gross Profit**. The total amount of equity earned during all the profitable trades .
- **Gross Loss**. The total amount of equity lost during all the losing trades.
- **Profit/Loss**. The dollar amount a strategy has earned against the dollar amount it lost. Profit/Loss is calculated by dividing gross profit into gross loss.
- **Commissions paid**. The amount of commissions paid to execute all generated trades.

  Account Size Required. The amount of money you are to have in your account to trade the system. Account Size Required must be used only for those systems that trade futures contracts. It is the main parameter for calculating the **Return on Account** value.

  The **Account Size Required** is calculated using the following formula: **Max Drawdown + (Margin x Number of Units)**, where **Margin** and

Number of Units are taken from the Position settings in the *Strategy* dialog box.

Return on account. A percentage of profit or loss the system has generated based on its **Account Size Required**. The parameter is calculated by dividing the **Net Profit** into the **Account Size Required**. This value is more important than the **Net Profit** value when you buy or sell on margin.

Trades

- **Total number of trades**. The total number of trades that were generated by the strategy.
- **Number of profitable trades**. The amount of profitable trades generated by the strategy.
- **Number of losing trades**. The amount of losing trades generated by the strategy.
- **% of profitable trades**. The percentage of profitable trades generated by the strategy.
- **% of losing trades**. The percentage of losing trades generated by the strategy.
- **Largest profitable trade**. The amount earned from the largest profitable trade.
- **Largest losing trade**. The amount lost during the biggest losing trade.
- **Average profitable trade**. The average amount earned by one profitable trade.
- **Average losing trade**. The average amount lost by one losing trade.
- **Average ratio**. A trade effectiveness ratio, calculated as the average profitable trade divided into the average losing trade.
- **Average trade**. A trade effectiveness ratio, represent the expected gain from each trade. It is calculated as follows: (% of profitable trades) * (average profitable trade) – (% of loosing trade * average losing trade).
- **Max consequent profitable trades**.
- **Max consequent losing trades**.
- **Average days in profitable trades**.
- **Average days in losing trades**.
- **Maximum number of days in profitable trade**.
- **Maximum number of days in losing trade**.

Return

- **Initial Capital**. The amount of starting capital selected to test the current system.

- **Final Capital**. The amount of the capital that exists at the end of the specified period.

- **Return on Initial Capital**. A percentage of the profit or loss the system generated based on its initial capital.

- **Cumulative return**. A percentage of the profit or loss calculated as the amount of money you made divided into the amount of money invested in the first trade.

- **Return on Max Drawdown**. The Net Profit divided into the maximum drawdown of the current strategy.

- **Buy & Hold return**. The percentage difference between the initial equity and the final equity in the buy and hold strategy. The buy and hold strategy assumes that you buy on the first day set in your model and hold the position. The profit is calculated based on the price on the first day and the price on the last day of the trading period.

- **Annual rate of return**. The annual rate of return for the whole period.

- **Buy & Hold annual rate of return**. The annual rate of return achieved for the same period using the buy and hold strategy.

Risk

Gain to Pain Ratio. A reward/risk ratio, calculated as the average annual profit divided into the average annual equity dip. For example, if the Gain to Pain ratio is equal to 3, the average annual profit is three times bigger than the average equity dip measured from the previous equity peak. The higher the ratio, the better the strategy is.

Sharpe Ratio. A reward/risk ratio calculated as a measure of an account return relative to the total variability of the account. The Sharpe ratio uses account standard deviation as the measure of risk. The higher the ratio, the better the strategy is.

Return Retracement Ratio. A reward/risk ratio that, unlike the Sharpe ratio, distinguishes upside and downside return fluctuations. The higher the ratio, the better the strategy is.

Max Equity Drawdown. A risk ratio, calculated as a percentage of the maximum equity dip from the previous equity peak. The lower the ratio, the better the strategy is.

Net Profit / Largest Losing Trade. A reward/risk ratio, calculated as the net profit divided into the maximum loss. The higher the ratio, the better the strategy is.

Net Profit / Max Drawdown. A reward/risk ratio, calculated as the net profit divided into the maximum drawdown. The higher the ratio, the better the strategy is.

Drawdown and Run-up

Max Drawdown. The largest equity dip the system has undergone within a single trade. Drawdown measures the open to the lowest (highest) unrealized low (high) of the trade.

Average Drawdown. The average equity dip of all the trades. This amount represents the system's more probable behavior compared to the maximum drawdown.

Max Run-up. The largest profit potential (realized or unrealized) experienced by the system on a single trade. Run-up measures the open to the highest (lowest) high (low) of the trade.

Average Run-up. The average maximum profit potential of all the trades. This amount represents the system's more probable behavior than the maximum run-up.

Outlier Trades

Positive outlier trades. The number of trades and cumulative profit/loss for positive outlier trades. Positive outlier trades are trades that are three standard deviations bigger than the average trade..

Negative outlier trades. The number of trades and cumulative profit/loss for negative outlier trades. Negative outlier trades are trades that are three standard deviations lower than the average trade..

Total outlier trades. The number of trades and cumulative profit/loss for all outlier trades.

Time Analysis

Trading period. The trading period in years, months, weeks and days from the start date to the end date.

Bars in the market. The number of days during which the strategy had open positions.

% in the market. The percentage of the test period during which the strategy had open positions.

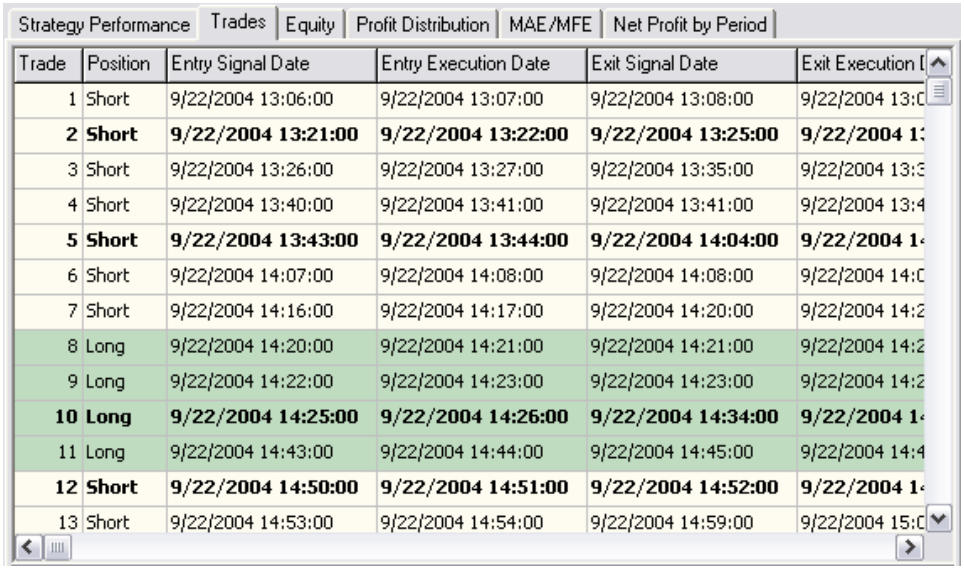
Bars out of the market. The largest number of bars during which the strategy did not have any open positions.

Average time in trades. The average number of bars in profitable/losing/all trades.

Average time between trades. The average number of bars between profitable/losing/all trades.

Trades Report

Trades Report displays details on the trades generated by a strategy during the test period.



Strategy Performance | Trades | Equity | Profit Distribution | MAE/MFE | Net Profit by Period

Trade	Position	Entry Signal Date	Entry Execution Date	Exit Signal Date	Exit Execution D
1	Short	9/22/2004 13:06:00	9/22/2004 13:07:00	9/22/2004 13:08:00	9/22/2004 13:0
2	**Short**	**9/22/2004 13:21:00**	**9/22/2004 13:22:00**	**9/22/2004 13:25:00**	**9/22/2004 1**
3	Short	9/22/2004 13:26:00	9/22/2004 13:27:00	9/22/2004 13:35:00	9/22/2004 13:3
4	Short	9/22/2004 13:40:00	9/22/2004 13:41:00	9/22/2004 13:41:00	9/22/2004 13:4
5	**Short**	**9/22/2004 13:43:00**	**9/22/2004 13:44:00**	**9/22/2004 14:04:00**	**9/22/2004 1**
6	Short	9/22/2004 14:07:00	9/22/2004 14:08:00	9/22/2004 14:08:00	9/22/2004 14:0
7	Short	9/22/2004 14:16:00	9/22/2004 14:17:00	9/22/2004 14:20:00	9/22/2004 14:2
8	Long	9/22/2004 14:20:00	9/22/2004 14:21:00	9/22/2004 14:21:00	9/22/2004 14:2
9	Long	9/22/2004 14:22:00	9/22/2004 14:23:00	9/22/2004 14:23:00	9/22/2004 14:2
10	**Long**	**9/22/2004 14:25:00**	**9/22/2004 14:26:00**	**9/22/2004 14:34:00**	**9/22/2004 1**
11	Long	9/22/2004 14:43:00	9/22/2004 14:44:00	9/22/2004 14:45:00	9/22/2004 14:4
12	**Short**	**9/22/2004 14:50:00**	**9/22/2004 14:51:00**	**9/22/2004 14:52:00**	**9/22/2004 1**
13	Short	9/22/2004 14:53:00	9/22/2004 14:54:00	9/22/2004 14:59:00	9/22/2004 15:0

For each trade, the report displays the following values:

- **Trade**. The consecutive number of the trade.
- **Position**. The position type, indicating whether the position was long or short.
- **Entry Date**. The entry date of the trade.
- **Exit Date**. The exit date of the trade.
- **Entry Signal**. The entry strategy signal: Buy or Short.
- **Exit Signal**. The exit strategy signal: Sell, Cover, Stop-Loss, Trailing Stop or Last Bar.
- **# of units**. The number of shares/contracts traded.
- **Entry Price**. The security's price when the position was opened.
- **Exit Price**. The security's price when the position was closed.
- **Commission**. The amount of money that was paid in commissions for this trade.
- **Slippage**. The amount of money that was lost on this trade due to slippage.
- **Profit/loss**. The profit/loss for this trade.

- **Profit/loss %**. The profit/loss for this trade expressed as percentage.

- **Bars held**. The number of bars contained in a position.

- **Profit/loss per bar**. Average profit/loss per bar that is profit/loss divided by number of bars held in the position.

- **Cumulative profit/loss**. The cumulative profit/loss for all the preceding trades and the current trade. For the first trade, this value is equal to the Profit/loss value. For the second trade, the profit from the first trade and the second trade are combined, and so on.

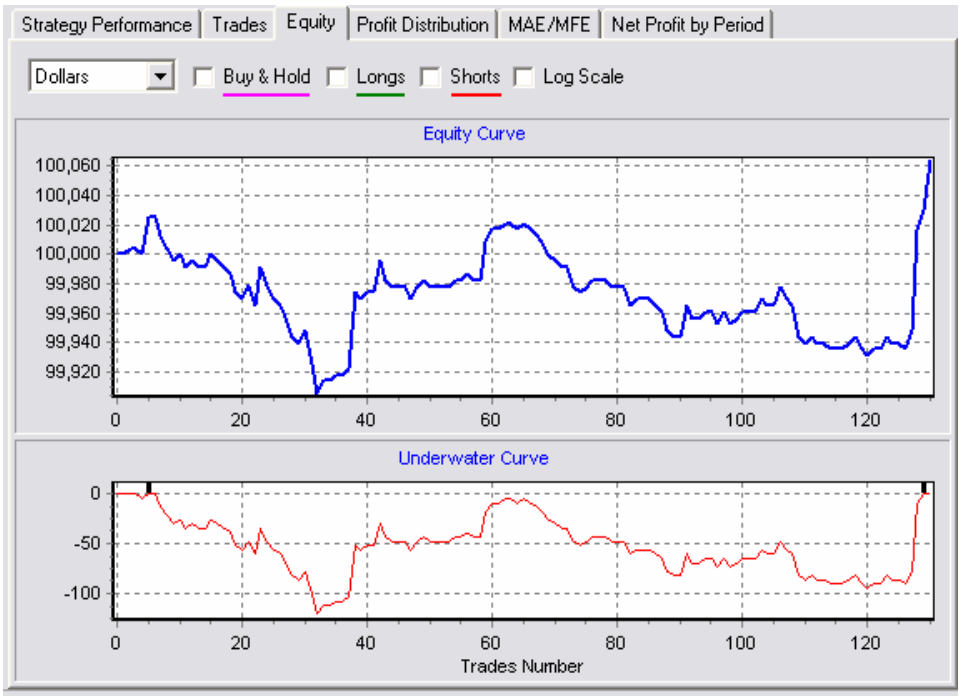
- **Cumulative profit/loss, %**. The percentage of the Cumulative profit/loss.

- **Run-up**. Trade run-up.

- **Drawdown**. Trade drawdown.

Equity and Drawdown Curves

Tradecision displays Equity and Drawdown curves.



Equity curve displays the account's equity during the strategy testing period. With this graph, you can easily get a general idea about how well the strategy performs.

X-axis indicates bars/months, y-axis indicates account equity.

Underwater curve displays the percentage equity dip at the end of each period measured from the previous equity peak. Each black vertical line represents a new equity peak. The curve between the peaks represents the equity dip from the previous equity peak expressed as percentage.

X-axis indicates months, y-axis indicates equity drawdown in percentage.

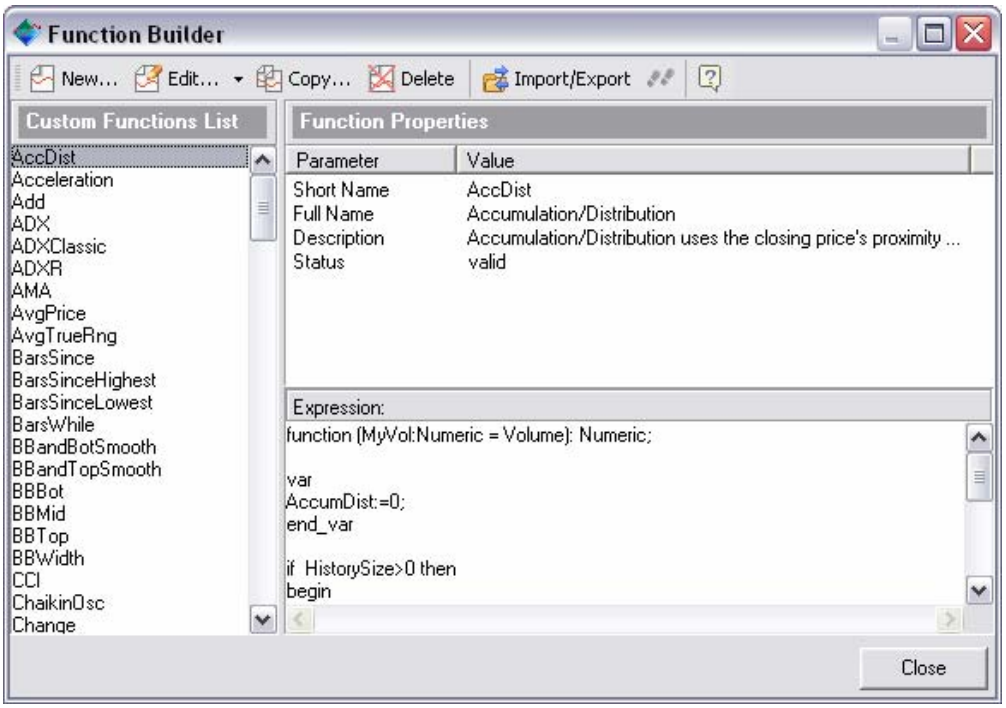
Taking into consideration the relative simplicity of equity and drawdown graphs and the informational depth they have, a combination of both graphs provides traders with an ideal methodology to compare profits and risks of different systems.

Chapter 16

Function Builder

Understanding Functions

Function Builder enables using the Tradecision library of built-in functions and creating custom functions and import/export functions, including importing functions from TradeStation.



You can use the functions in Tradecision when developing a strategy, technical indicator, study, and so on.

Each function has a name and returns a value based on some underlying calculation. A function can be nested into another function. Functions can be combined using mathematical operators.

Many of the functions require parameters that provide the information required to calculate the function value. Even if a function does not require any parameters, it must be followed by a pair of parentheses.

For example, *AutoTrendMinor()*

Creating a New Function

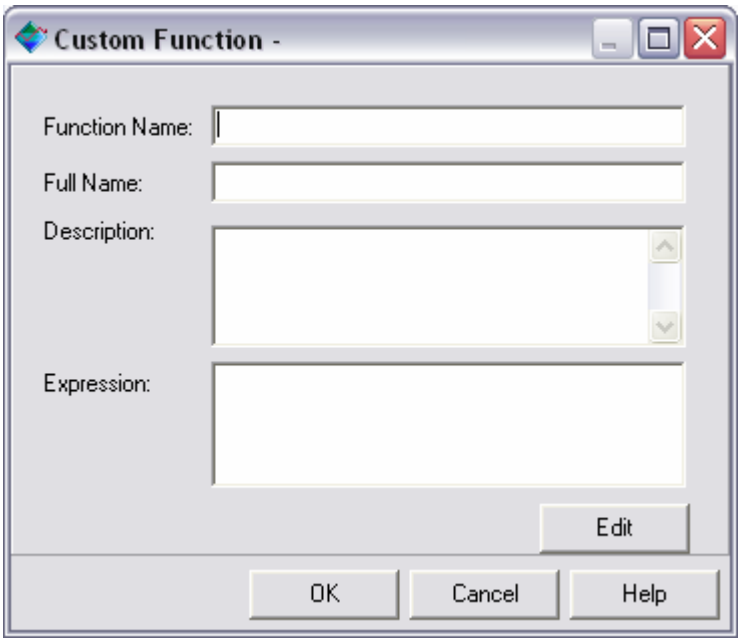
To create a new custom function:

1. From the **Tools** menu, select **Function Builder**.

The *Function Builder* dialog box is displayed.

2. In the *Function Builder* dialog box, click **New**.

The *Custom Function* dialog box is displayed.



3. In the *Custom Function* dialog box, enter the following information in the corresponding boxes:

- **Function Name;**
- **Full Name;**
- **Description**.

4. To define the function formula, under **Expression**, click **Edit** .

The *Improvian Editor* dialog box will be displayed.

5. In the **Expression** box of the *Improvian Editor* dialog box, write the formula for the function.

6. Click **OK**.

For details, refer to Using **Improvian Editor**.

7. Click **OK** to save the new function.

Editing a Function

To edit a function:

1. From the **Tools** menu, select **Function Builder**.

The *Function Builder* dialog box will be displayed.

2. In the *Function Builder* dialog box, select the function you want to edit and click **Edit**.

The *Custom Function* dialog box will be displayed.

3. In the *Custom Function* dialog box, edit the **Full Name** and/or **Description** as appropriate.

4. To define the **function** formula, under the **Expression,** click **Edit**.

The *Improvian Editor* dialog box will be displayed.

5. In the **Expression** box of **Improvian Editor** dialog box, edit your function formula, if required.

6. To save the changes, click **OK**.

Copying a Function

You can make a copy of the function from the *Function Builder* dialog box using the **Copy** button. This capability is used when you want to create a new **function** that is very similar to another one.

To copy a function:

1. From the **Tools** menu, select **Function Builder**.

The *Function Builder* dialog box will be displayed.

2. From the **Custom Function List** in the *Function Builder* dialog box, select a **function** that you want to copy.

3. Click **Copy**.

All the **function** data will be copied and the **Custom Function** dialog box will be displayed.

4. Make changes to the values of the following the appropriate text boxes (Function Name, Full Name, Description and Expression).

5. Click **OK**.

Deleting a Function

You can delete a selected function from the *Function Builder* dialog box using the **Delete** button.

To delete a function:

1. From the **Tools** menu, select **Function Builder**.

2. In **Custom Function List** of the *Function Builder* dialog box, select the function that you want to delete.

3. Click **Delete**.

Importing a Function

To import functions:

1. In the *Function Builder* dialog box, click **Import/Export** and then select **Import Functions**.

The *Import – User Function(s)* dialog box will be displayed.

2. From the *Import – User Function(s)* dialog box, click **Browse** to browse for the folder from which you want to import the functions on your local hard drive.

3. Choose the functions that you want to import by selecting the corresponding check boxes.

4. Click **Import**.

All the imported functions will be added to your **Custom Functions List**.

5. Click **Close**.

Exporting a Function

To export a function or functions:

1. In the *Function Builder* dialog box, click **Import/Export**, and then select **Export Functions**.

The *Export - User Function(s)* dialog box is displayed.

2. In the *Export - User Function(s)* dialog box, click **Browse** to browse for the folder on your local hard drive to which you want to export the functions.

3. Choose the functions that you want to export by selecting the corresponding check boxes.

4. Click **Export**.

The functions will be saved into the folder specified by you with the **.tfn** extension. Now you can send them to your friends or partners by e-mail. The recipient will need to use the **Import** command to work with functions.

5. Click Close.

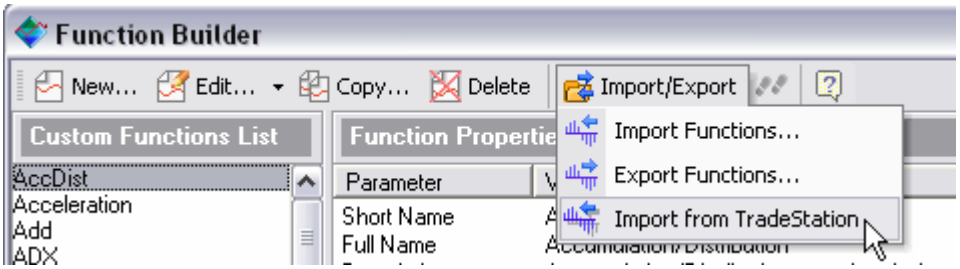
Importing a Function from TradeStation

Using **Function Builder**, you can import TradeStation functions.

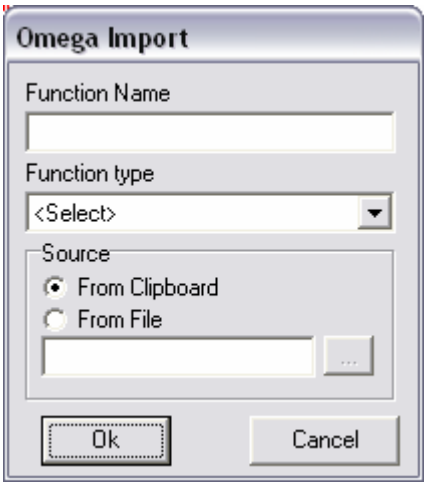
To import a function from TradeStation:

1. Open **Function Builder**.

2. Click **Import** and select **Import from TradeStation**.



The *Omega Import* dialog box will be displayed.



3. In the *Omega Import* dialog box, enter the name of the required function and select the function type. The following function type options are available:

- **Numeric,**
- **String,**
- **Boolean.**

4. Choose the source from which the functions are to be imported by selecting one of the following options

- **From Clipboard;**
- **From File.**

Note: *If you select the* ***From Clipboard*** *option, you will need to run TradeStation, copy the function, and then paste it in Improvian Editor.*
The function type and name have to be the same as in TradeStation.

***Note**: If you select the **From File** option, you will need to locate the imported file on your PC.*

5. Click **OK**.

The **Improvian Editor** will be displayed for you to check, edit and approve the function syntax. For details, refer to *Using Improvian Editor*.

6. In the **Improvian Editor,** click **OK**.

The function will be added to the **Custom Functions List**.

Chapter 17

Alert Builder

You can create, modify and delete alerts using Alert Builder. You can receive whatever alerts you prefer on any of the issues in your portfolio through audio or visual messages or by e-mail. This enables you to act immediately on any arising profitable opportunities.

Understanding Alerts

Alerts allow to you set and receive notifications for specific symbol(s) and conditions. Alerts can be set on trading signals or price changes. You need to define the condition for an alert and Alert Builder will informs you when the event occurs for the given symbol(s).

The Tradecision software has an advanced system (Alert Builder) for creating custom, user-defined alerts. Alert Builder includes a capability that will alert the user each time an event occurs by displaying a message and/or playing a sound file. Moreover, alerts can also be sent to you by email.

Alert Builder allows the user to set and receive notifications for specific symbol(s) and conditions. Alerts can be set on trading signals or price changes. To set an alert, you simply need to define a condition, and Alert Builder will inform you when the event occurs.

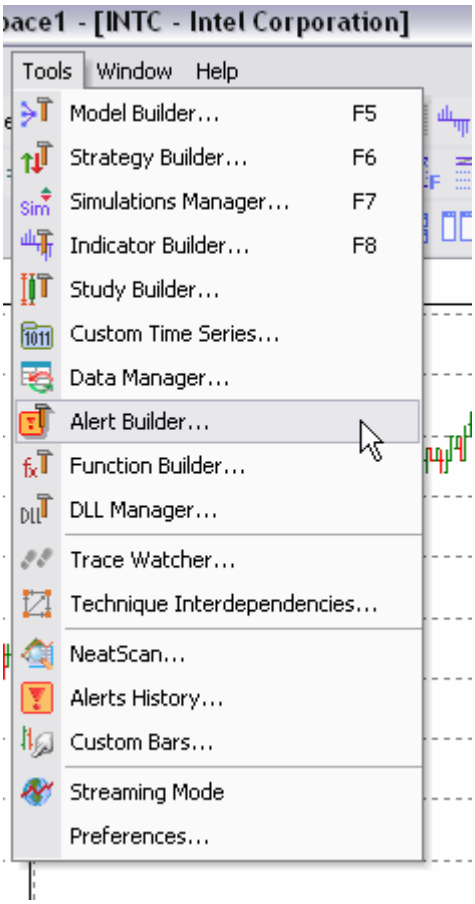
To create an alert, you need to know what you want the alert to notify you about. With the help of the Improvian language, you can easily express your ideas in a formula, enabling the application to inform you when the defined condition is met.

Note: *Tradecision also provides strategy alerts that differ from the alerts you create using Alert Builder. Strategy alerts are alerts that are automatically generated by a trading strategy inserted into a chart. To access the alerts list, from the* ***Tools*** *menu, select* ***Alerts History****. The Alerts History dialog box will display both the Custom Alerts that you created with using Alert Builder and -strategy alerts (if a strategy has been inserted into a chart).*

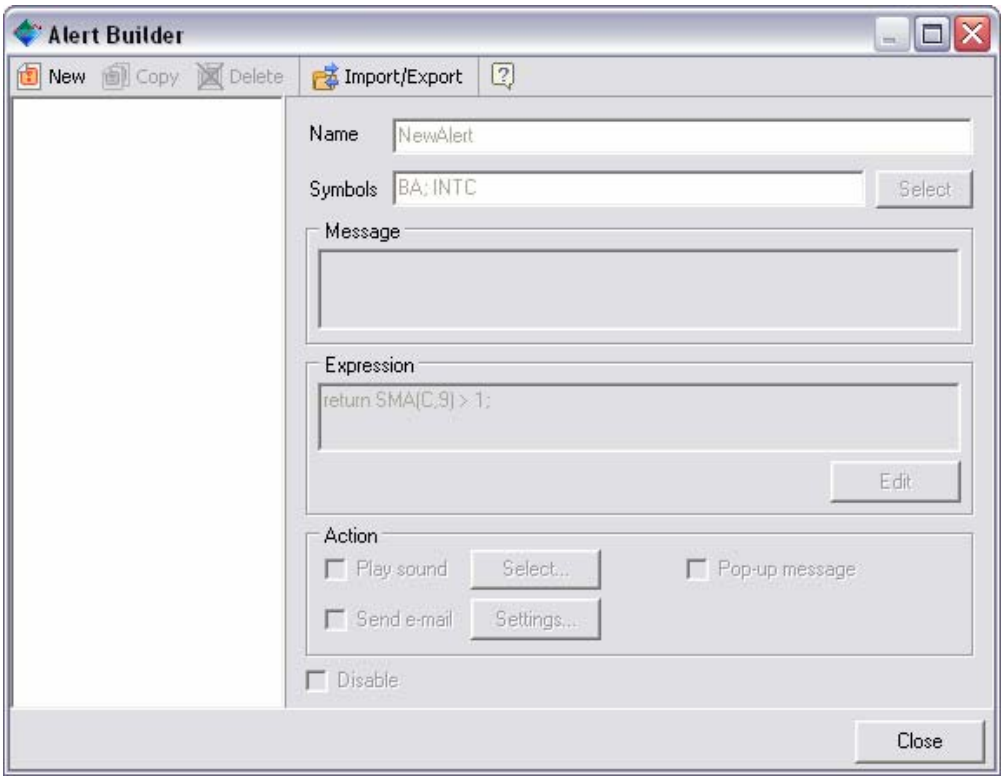
Creating an Alert

To create a new alert:

1. From the **Tools** menu, select **Alert Builder**.



The *Alert Builder* dialog box will be displayed.



2. In the *Alert Builder* dialog box, click **New**.

The *Improvian Editor* window will be displayed.

3. In the **Expression** box, define a formula containing the alert rules, and click **OK**.

A new alert will be displayed in the **Alerts List** *of the Alert Builder dialog box.*

4. In the **Name** box, enter the name of an alert.

5. In the **Symbol** box, enter the symbol on which you want the alert to appear.

Note*: Also, you can select several symbols. Use the* ***Select*** *button for a quick symbol look-up.*

6. In the **Message** box, enter a text (message) that you want to be displayed in the alert message and alerts history.

7. In the **Action** area of the *Alert Builder dialog box,* you select the way the alert will be shown to you by selecting any of the following corresponding check boxes:

- **Pop-up massage**.
- **Play sound.**

Note*: To find an audio file on your computer, click* ***Browse.****)*

- **Send e-mail.** An e-mail message will be sent to you or someone else when the set alert is triggered.

  ***Note**: To configure SMTP Sever and E-mail address, click **Setting**.*

  ***Note**: Select the **Disable** check box if you want to inactivate an alert .*

Deleting an Alert

To delete an alert:

1. From the **Tools** menu, select **Alert Builder**.

The *Alert Builder* dialog box will be displayed.

2. In the Alerts List of the Alert Builder dialog box, select the alert that you want to delete.

3. Click **Delete**.

The alert will be deleted from Alert Builder.

Copying an Alert

You can make a copy of the selected alert in the *Alert Builder* dialog box using the **Copy** button. This capability is used when you want to create a new alert that is supposed to be the same as another one.

To copy an alert:

1. From the **Tools** menu, select **Alert Builder**.

The *Alert Builder* dialog box will be displayed.

2. In the **Alerts List** area, select the alert that you want to copy and then click **Copy**.

The new alert will be added to the **Alert List**.

3. In the *Alert Builder* dialog box, enter the following parameters of the alert, such as **Name**, **Expression**, **Message**, and **Action**.

Import/Export

Tradecision's easy-to-use Import/Export tool you can exchange any of your trading ideas with your friends. To do this, you have to save alerts on your local hard drive and after that you will able to share the alerts with your friends and partners.

Importing Alerts

To import alerts:

1. In the *Alert Builder* dialog box, click **Import/Export**, and then select **Import Alerts**.

The *Import - Alerts* dialog box will be displayed.

2. In the *Import - Alerts* dialog box, click the button to browse for the folder on your local hard drive from which you want to import the alerts.

3. Choose the alerts that you want to import by selecting the corresponding check boxes.

4. Click **Import**.

All the imported Alerts will be added to your **Alerts List**.

5. Click **Close**.

To export Alerts:

1. In the *Alert Builder* dialog box, click **Import/Export**, and then select **Export Alerts**.

2. In the *Export - Alerts* dialog box, click the button to browse for the folder on your local hard drive to which you want to export the alerts.

3. Choose the alerts that you want to export by selecting the corresponding check boxes.

4. Click **Export**.

The alerts will be saved in the folder specified by you with the extension **.tal**. Now you can send them by email to your friends or partners. The recipient will need to use the **Import** command to work with the alerts.

5. Click **Close**.

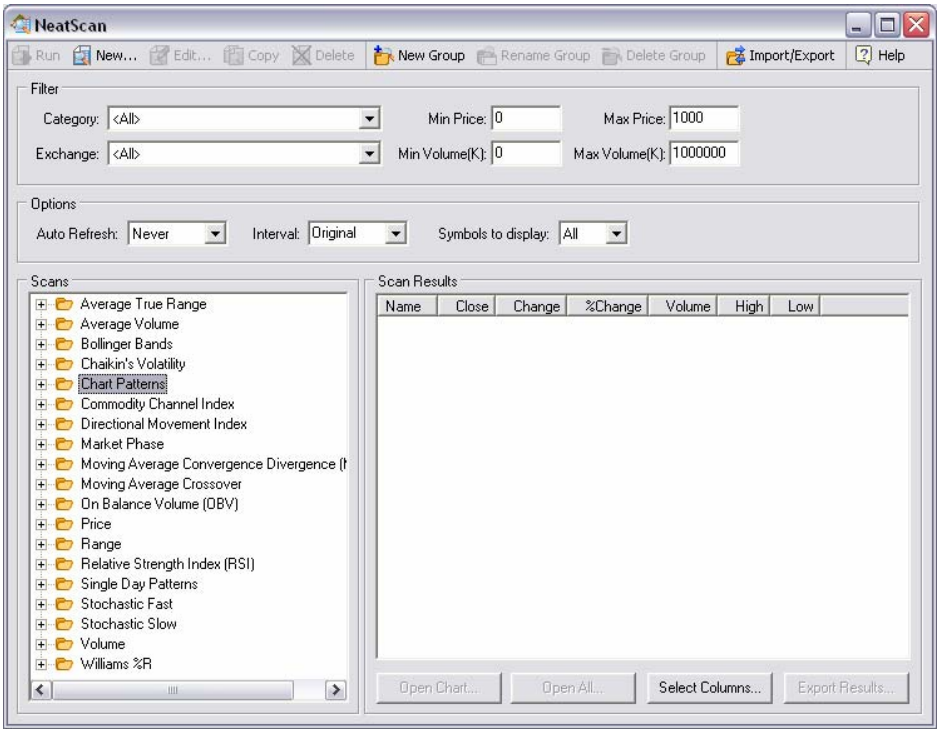
Chapter 18

NeatScan Market Scanner

Understanding Tradecision NeatScan

Tradecision NeatScan is a powerful, flexible, multi-purpose market scanner that will keep you on top of your trading opportunities.

NeatScan is a multi-symbol scanning and analyzing program which gives you the ability to locate money-making opportunities. As you know, a scanner's main task is finding stocks that meet the characteristics you are interested in. With the help of NeatScan, you will be able to examine hundreds of symbols, stored in Tradecision's Data Manager, using a set of diverse criteria, defined by you.



With the NeatScan, you will be able to:

- Observe a multitude of symbols and/or intervals arranged and ranked in any order you prefer.
- Automatically scan your symbol portfolio in real time in order to obtain easy-to-read reports on the results of each search.
- View the market activity in real time, arranged by volume, amount and percentage gainers and losers, as well as according to other multiple criteria.
- Customize your searches based on price, volume and market cap, and remove those stocks that do not meet your trading needs.
- Gain easy access to Tradecision charts to find out more about each possible trading opportunity

Using Built-In Library of Scans

NeatScan™ includes a library of built-in scans, such as MACD, MA Crossover, Stochastic, Price, Bollinger Bands and many more. However, with the help of Tradecision Formula Language (TFL), you can create virtually any scan you may need.

Defining Custom Columns

You can define anything from the simplest to the most complicated criteria for market scanning and custom column calculation. You can create custom scanning formulas and use the built-in system of filters.

In addition to displaying different kinds of standard price information based on the last bar in a chart, the NeatScan functionality of Tradecision allows performing calculations for any other function or indicator, provided the corresponding formula can return a numerical value. The calculated information will be displayed in a specifically created custom column along with the displayed standard price information in the *Scan Results* window.

Choosing a Time Frame

Both built-in and custom scans can be applied to any of the time frames that you use in Tradecision:

- 1-, 5-, 10-, 15-, 30- and 60 minute: for short-term and day traders.
- Hourly: for swing traders.
- Monthly, weekly and daily: for long-term investors and position traders.

Filtering by Price and Volume

In order to indicate the number of shares a stock has to trade, you can indicate specific volume parameters using the Min Volume (K) and Max Volume (K). If necessary, you can change the minimum price and maximum trading price of a symbol to be scanned using the Min Price and Max Price options.

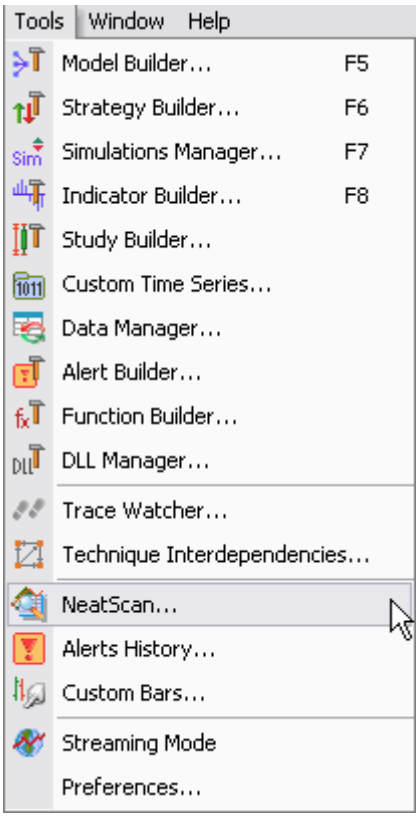
Opening the Scanner

To open the NeatScan:

1. Open Tradecision.

- From the **Tools** menu, select **NeatScan**.

The NeatScan application will be displayed.



Running a Scan

To run a scan:

1. In the **Scans** area, select a scan that you want to run.

2. On the toolbar menu, click **Run**.

A progress bar will be displayed.

3. The scanning results (symbols and their parameters) will be displayed in the **Scan Results** area.

Creating a New Scan

To create a new scan:

1. In the **Scans** area, select the group to which you want to add a new scan.

2. On the toolbar menu, click **New**.

3. In the **Scan Name** in the **New Scan** area, enter the name of the scan being created.

4. To use the **Improvian Editor**, click **Edit**.

The *Improvian Editor* dialog box will be displayed.

5. In the **Expression** box, enter an expression for the scan.

Note**: To verify the correctness of the expression , click **Check.

6. If you want to create a special column for the scan, do the following:

- Click **Add**;
- In the **Column name** box, enter a name for the new column;
- Click **Edit** to write a formula for the column.

***Note:** A formula has to have a numeric value.*

–OR-

Skip to Step 7 of this procedure.

7. Click **OK**.

The scan will be added to a selected group.

Editing a Scan

To edit a scan:

1. On the toolbar menu, click **Edit**.

2. In the *Edit Scan* dialog box, you can edit any of the parameters of the selected scan, such as **name**, **expression** and **column name**.

3. To save the changes, click **OK**.

Deleting a Scan

To delete a scan:

1. In the **Scans** area, select the scan that you want to delete.

2. From the toolbar menu, select **Delete**.

The scan will be deleted from the **Scans** area.

Creating a New Scan Group

To create a new scan group:

1. From the toolbar menu, click **New Group**.

2. Enter a name for the new group in the folder that has appeared.

Deleting a Scan Group

To delete a scan group:

1. In the **Scans** group box select a group you want to delete.

2. On the toolbar menu, click **Delete Group**,

–OR-

at the bottom of the **Scans** area, click **Delete Group**.

The group will be deleted from the **Scans** area.

Import/Export

To use the **Import/Export** tool, you have to save scans on your local hard drive and after that you will be able to share the scans with your friends or partners.

Importing Scans

To import scans:

1. On the toolbar, click **Import/Export**, and then select **Import**.

The *Import - Scans* dialog box will be displayed.

2. In the *Import - Scans* dialog box, click the button to browse for the file on your local hard drive from which you want to import the scans.

3. Choose the scans that you want to import by selecting the corresponding check boxes.

4. Click **Import**.

All the imported scans will be added to your scans list.

5. Click **Close**.

Exporting Scans

To export scans:

1. On the toolbar, click **Import/Export**, and then select **Export**.

The *Export - Scans* dialog box will be displayed.
2. In the *Export - Scans* dialog box, click the button to browse for the file on your local hard drive from which you want to export the scans.

3. Choose the scans that you want to export by selecting the corresponding check boxes.

4. Click **Export**.

The scans will be saved in the folder specified by you with the extension **.scan**. Now you can send them to your friends or partners by e-mail. They will need to use the **Import** command to work with the scans.

5. Click **Close**.

Using the Filtering Functionality for Scanning

You can use the filtering funftionality in the **Filter** area to locate required scans and manage them more efficiently.

To sort scans using the filtering functionality:

1. From the **Category** list, select the type of the scans that you want to find. The following options are available:

- **All;**
- **Forex;**
- **Futures;**
- **Indices;**
- **Mutual Funds;**
- **Stocks.**

2. From the **Exchange** list, select the exchange that you have been following.

***Note**: If necessary, you can change the minimum price and maximum price for scanning using the **Min Price** and **Max Price** boxes.*
***Note**: You can indicate specific volume parameters using the **Min Volume (K)** and **Max Volume (K)** edit boxes.*

Using Additional Options for Scanning

In the Options group box you can:

1. Choose the **Auto Refresh** option to use **1, 2, 5, 10, 30**, or **Never** auto-refreshment parameters.

2. Select the Interval option to use **1, 2, 3, 5, 10, 20**, or **Original** data interval parameters.

3. Opt the **Symbols to display** option to select a number of symbols you want to be shown you in the **Scan Results** group box after the scanning process will be completed.

To open scan results into chart(s):

1. In the **Scan Results** area, click the **Open Chart** or **Open All** button.

   The chart(s) will be opened in the corresponding chart window(s).

To select columns:

1. In the **Scan Results** area, click **Select Columns**.

2. In the **Columns** area, you can select any or all of the following columns that you want to be displayed at the top of the **Scan Results** area:

- **Name**,
- **Close**,
- **Change**,
- **%Change**,
- **Volume**,
- **High**,
- **Low**.

3. Click **Close**.

To export scanning results into a text file:

1. In the **Scan Results** area, click **Export Results**.

The *Save As* dialog box is displayed.

2. In the *Save As* dialog box, locate the folder to which you want to export the file on your local hard drive and enter a name for the file.

3. Click **Save**.

Note: *You can select columns that you want to export. To do this, after you get a list of your scanning results, you need to click the* ***Select Column*** *button and then select the columns that you want to export into a text file.*

Note: *Exporting scanning results into a text file is not to be confused with exporting scans. Exporting scans results allows you to save a list of symbols with their parameters into a text file. When you use the Export scans feature, you export scans themselves along with their formulas into a specific file with the extension* ****scan*** *resolution.*

Chapter 19

DLL Manager

Understanding DLL Manager

With DLL Manager, you can refer to functions/subroutines stored in .dll files.

DLL stands for Dynamic Link Library and indicates a file with a .dll extension. DLLs are used by applications to store functions and data required for proper operation. You can register a function using the DLL Manager tool**.** Once properly registered, a DLL can be used as a standard function. For example, it can be used for creating custom indicators.

For a DDL to be registered, it must be in compliance with the following requirements:

1. The DLL is to use the standard parameter-transferring mechanism, for example, in C++, this is done by using the keyword "_stdcall». The following is an example of how a function is declared:

```
declspec(dllexport) int _stdcall MyDouble(double b)
```

2. Only the following parameter types can be used:

- int - 4 bytes (integer);
- float – 4 bytes (a number with a floating point);
- double 8 – bytes (a number with a floating point);
- bool 1- byte (0 false, otherwise true);
- int * 4 –bytes (points to the cell with one number);
- float * 4 – bytes (points to the cell with one number);
- double * 4 – bytes (points to a cell with one number);
- bool * 4 –bytes (points to the cell with one number);

3. The following types of returned values can be used:

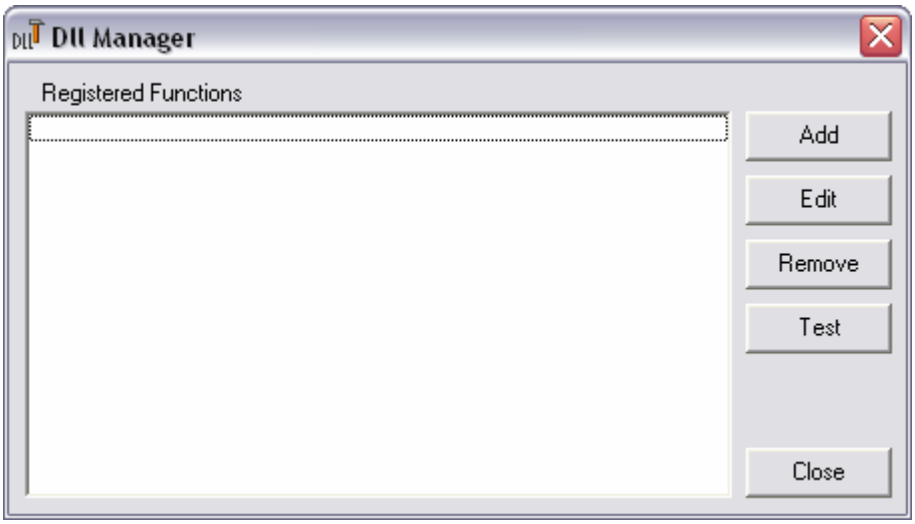
- int - 4 bytes (integer);
- float – 4 bytes (a number with a floating point);
- double 8 – bytes (a number with a floating point);
- bool 1- byte (0 false, otherwise true).

***Note**: All the names of the types are indicated for C++. If you need to use a library written in another language, you need to use the corresponding types. All the functions cause no errors while working with software and hardware.*

Registering a New Function

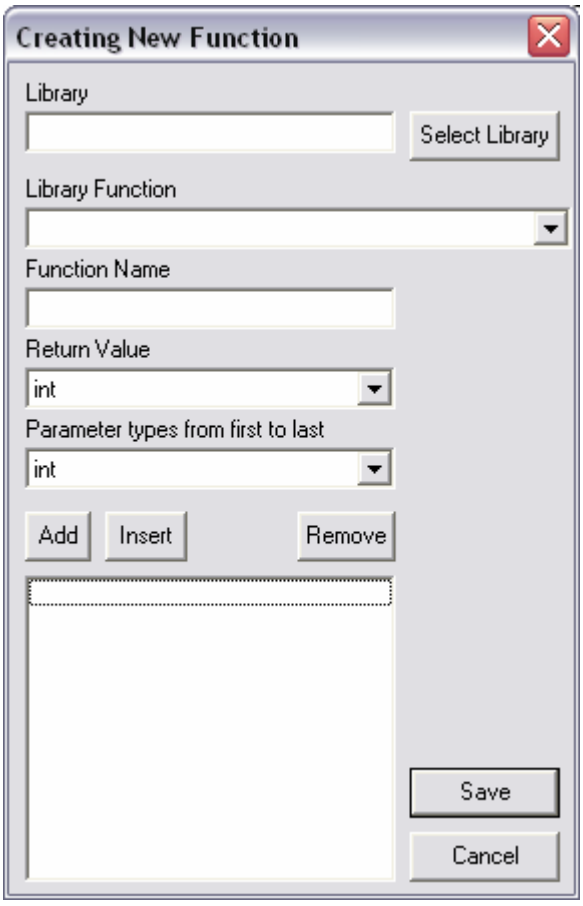
To register a new function:

1. From the **Tools** menu, select **DLL Manager**.
The *Dll Manager* dialog box will be displayed.



2. Click **Add.**

The *Creating New Function* dialog box will be displayed.



3. To locate a .dll file on your PC, in the *Creating new function* dialog box, click **Select Library**.

4. From the **Library Function** list, select the function that you want to register.

5. In the **Function Name** box, enter the name of the function.

6. From the **Return Value** list, select a return value. The following options are available:

- **int.** (Integer Value);
- **Float.** (Floating Point Value);
- **Double.** Floating Point Value with Double capacity**;**
- **Bool.** Boolean.

7. From the **Parameter types from first to last** list, select a parameter type for the function.
8. Click **Add**.

***Note**: You can select several parameter types.*

9. Click **Save**.

The function will be added to the **Registered functions** list and the **External DLL functions** category of Improvian Editor.

Editing a Function

To edit a function:

1. From the **Tools** menu, select **DLL Manager**.

The **Register function** dialog box will be displayed.

2. Select the function that you want to edit and click **Edit**.

3. In the *Creating new function* dialog box, modify the required parameters as appropriate.

4. Click **Save**.

Removing a Function

To delete a function:

1. From the **Tools** menu, select **DLL Manager**.

The **Register function** dialog box will be displayed.

2. Select the function that you want to delete and click **Remove**.

The function will be deleted from the **Register function** list.

Chapter 20

Custom Time Series

Custom Time Series is a capability that allows you to add external data for market calculations. The data should be stored on your local hard drive in a text file. You can use proprietary indicators and model outputs in your trading strategy or as market gauges.

Once created, custom time series are added to the Custom Time Series category available in Improvian Editor. You can use custom time series to build your custom indicators, custom studies, strategies, and neural models.

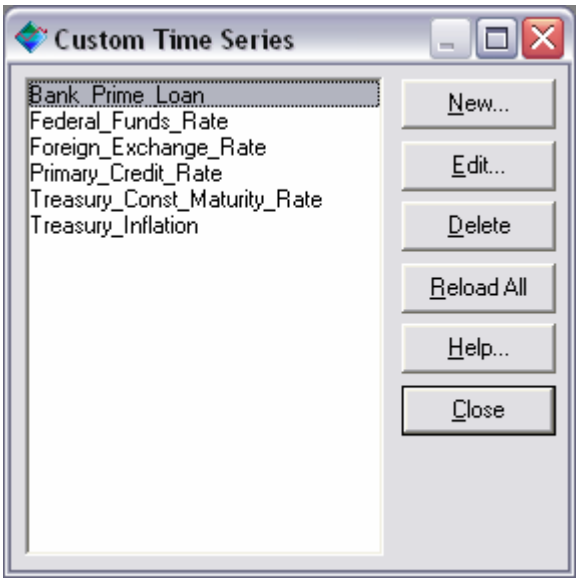
For example, very often you can improve your model performance by using fundamental factors and market indices as model inputs. Similar to custom time-series, you can use 3-rd party time-series, such as the values of proprietary indicators and studies.

Adding New Custom Time Series

To add a new Custom Time Series:

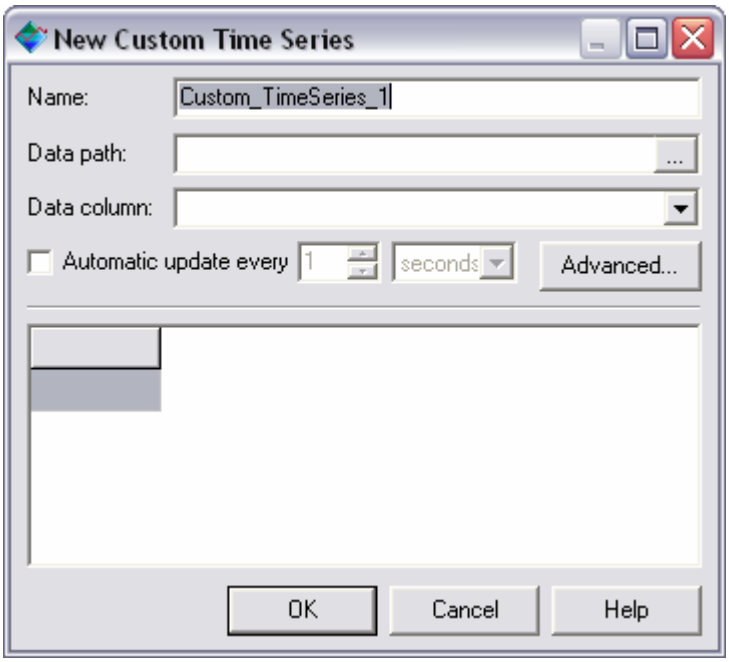
1. From the **Tools** menu, select **Custom Time Series**.

The *Custom Time Series* dialog box will be displayed.



2. In the *Custom Time Series* dialog box, click **New**.

The *New Custom Time Series* dialog box will be displayed.



3. In the *New Custom Time Series* dialog box, type the name of the Custom Time Series being added.

4. To locate the text file in which the data is stored, click the icon in the **Data Path** box.

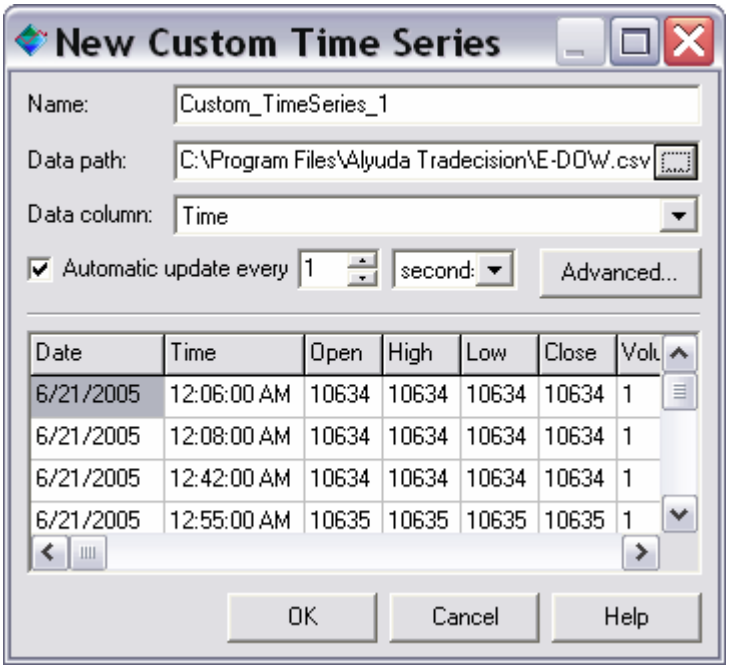
Note: *The first column of your text file must contain dates only.*

Note: *You can select the* ***Automatic update every*** *box to enable the automatic data update capability for new the Custom Time Series. Tradecision will automatically update the data from the file at the time interval set by you.*

6. To manually define the delimiters, formats and separators used in your text data file, click **Advanced..**. For details, refer to *Advanced Text import parameters*.

7. From the **Data Column** list, select the column containing the numeric data to be imported.

8. Click **OK**.



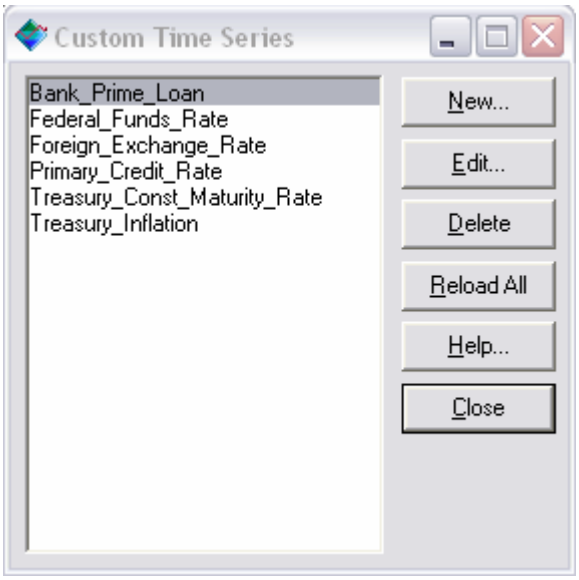
Reloading All the Existing Time Series

To save your time when it is possible, you can reload all the existing time series. The Reloading functionality is used when the contents of the CSV files that serve as source files for the time series are modified. When the time series are reloaded, their contents are updated in accordance with the information currently contained in the corresponding CSV files.

To reload all custom time series:

1. From the **Tools** menu, select **Custom Time Series**.

The *Custom Time Series* dialog box will be displayed.



2. Click **Reload All**.

Defining Advanced Text Import Parameters

To define parameters manually:

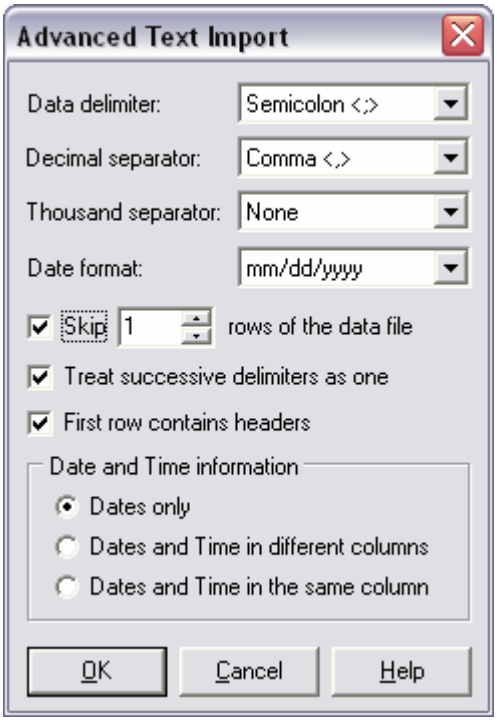
1. From the **Tools** menu, select **Custom Time Series**.

The *Custom Time Series* dialog box will be displayed.

2. In the *Custom Time Series* dialog box, click **New**.

The *New Custom Time Series* dialog box will be displayed.

3. To manually define the delimiters, formats and separators used in your text data file, in the new *Custom Time Series* box, click the **Advanced...** button.



4. In the **Data delimiter** box, select **None**, **Double quote**, or **Single quote** depending on the way the strings are separated in your text file.

5. In the **Decimal separator** box, select **Point** or **Comma** depending on which of the characters is used in your text file.

6. In the **Thousand separator** box, select the **None**, **Point**, **Comma**, or **Single quote** depending on which of these is used in your text file.

7. In the **Date format** box, select the date format that you want to use.

8. If you would like to skip some of the rows in the data file, in the **Skip … rows of the data file** box, select the desired number of rows to be skipped.

9. If your file contains any successive delimiters that you want to be ignored during the import, select the **Treat successive delimiter as one** check box.

10. If the first row of your file contains headers and you want them to be ignored during the import, select the **First row contains headers** check box**.**

Note*: Steps 5 and 6 of this procedure are optional.*

11. Click **OK**.

Modifying the Custom Time Series

To modify the Custom Time Series:

1. From the **Tools menu,** click **Custom Time Series**.

The *Custom Time Series* dialog box is displayed.

2. In the *Custom Time Series* dialog box, select the Custom Time Series that you need to modify and click **Edit**.

The *Edit - Custom Time Series* dialog box will be displayed.

3. In the *Edit - Custom Time Series* dialog box, make the required changes.

4. Click **OK**.

Deleting Custom Time Series

To delete a Custom Time Series:

1. From the **Tools** menu, select **Custom Time Series**.

The *Custom Time Series* dialog box will be displayed.

2. In the *Custom Time Series* dialog box, select a **Custom Time Series** that you want to delete and click **Delete**.

3. Click **Yes** and then click **Close**.

Chapter 21

Preferences Functionality

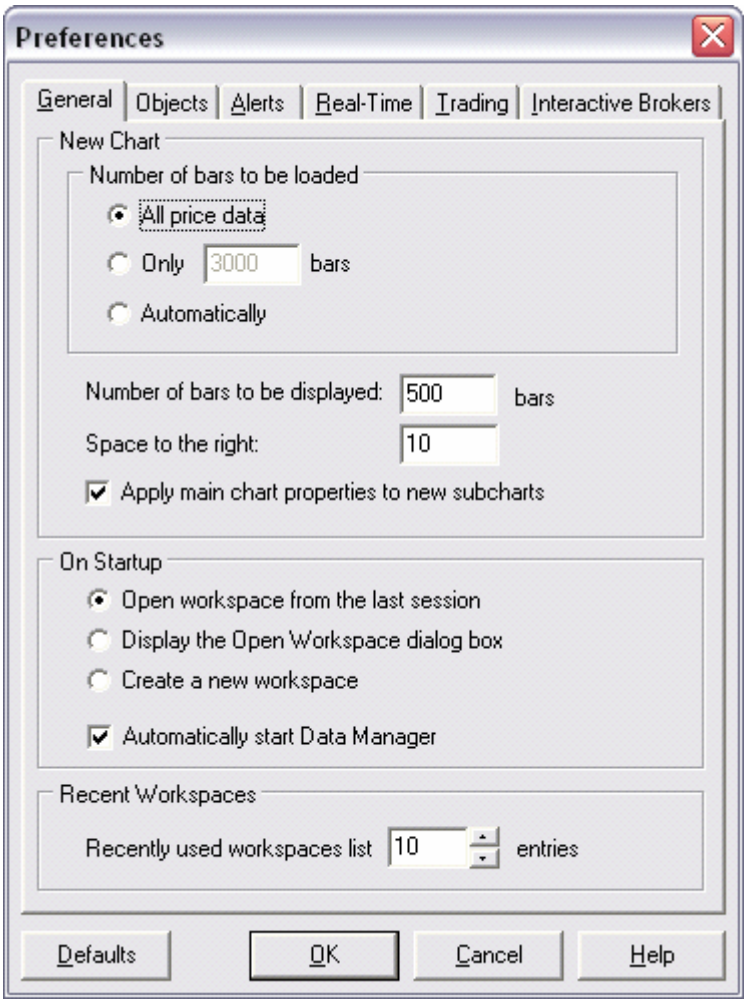
The *Preferences* dialog box enables setting a variety of multiple preferences, grouped together by purpose in the dialog box's five following tabs: *General*, *Objects*, *Alerts* and *Real-Time*.

To open the Preferences dialog box:

1. From the **Tools** menu, click **Preferences**.

General tab

The **Number of bars to be loaded** area in the **General** tab is used for loading bars into a chart.



All price data
This option defines how many bars will open when a symbol is loaded. If the **All price data** is selected, all bars will be loaded.

Only...bars

If the **Only...bars** is selected, the indicated number of the latest bars will be loaded. Only loaded bars can be used for strategy testing, model creation and other analysis.

Automatically
If **Automatically** is selected, the number of bars to be loaded will be determined by Tradecision.

In the **New chart** area of the *General* tab, you can define the following parameters:

- **Number of bars for the blank space**. In the **Space to the right** box, you can enter the number of bars to define the size of the blank space to the right of the last bar in the chart. For example, this will be useful, when you want to insert drawing objects and studies into a chart to forecast future price movements. This space is also used to draw the Fibonacci Clusters study.

- **Automatic application of colors and fonts**. Select the **Apply main chart properties to new sub-charts** check box, if you want to automatically apply chart colors and fonts to new sub-charts.

  Note: *New parameters will be applied to a new chart only.*

- **Automatic opening of a specific workspace**. In the **On Startup** area you can specify the workspace that will open automatically every time you start Tradecision. You can also specify that no workspace should open.

- **Automatic opening of a specific workspace from the last session.** Select the **Open Workspace from the last session** check box if you want a workspace from the last session to open automatically.

- **Automatic opening the *Open Workspace* dialog box.** Select the **Display "Open Workspace" dialog** check box, if you want to the *Open Workspace* dialog box to be displayed automatically during the launch of the Tradecision application.

- **Creation of a new workspace**. Select the **Create new workspace** check box, if you want to create a new workspace during the launch of the Tradecision application.

- **Automatic launch of Data Manager**. Select the **Automatically start the Data Manager** check box for Data Manager to be launched automatically every time you start the Tradecision application.

- **Maximum number of workspaces displayed**. The **Recent Workspaces** box is used to define the maximum number of workspaces that will be displayed after you select **Reopen** from the **File** menu. By default, 10 most recent workspaces are displayed.

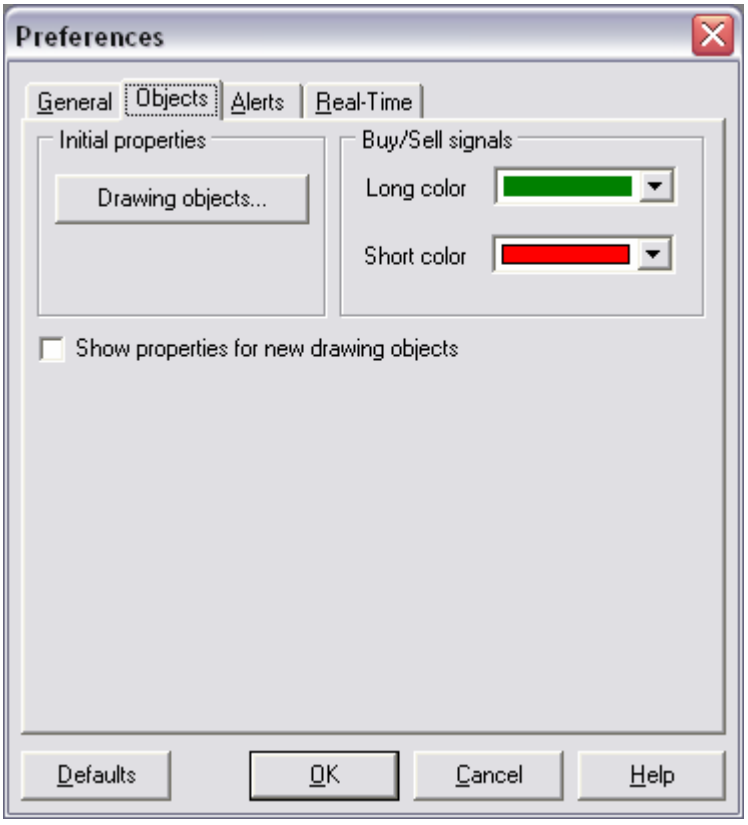
  Note: *New parameters will be applied after you restart Tradecision.*

Objects tab

The *Objects* tab of the *Preferences* dialog box allows setting and adjusting a variety of parameters related to drawing objects and the way they are displayed.

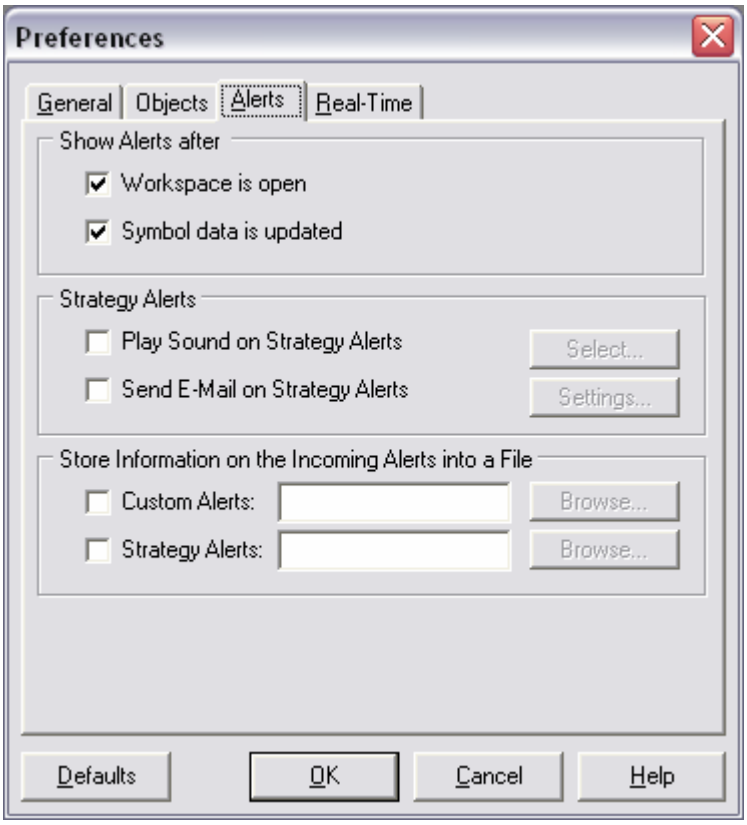
- **Colors and Style**. In the **Initial properties** area, you can define the default colors and style of drawing objects. For this, click **Drawing objects.** The *Object Properties* dialog box will be displayed. Set the parameters you need and click **OK**.

- If you want the *Object Properties* dialog box to be displayed every time you insert a drawing object into a chart, select the **Show properties for new drawing objects** check box.



- **Colors of the Long and Short Positions**. In the **Buy/Sell signals** area, you can define separate colors for long and short positions.

Alerts tab



- **Alerts**. In the **Show alerts after** area, you can set an alert or alerts by selecting an appropriate check box. The following alert options are available:
- **Workspace is open;**
- **Symbol data is updated.**

Note: *An alert will be shown to you if new data has been added and a chart with a strategy (with buy/sell signals in it chart) has been opened. Tradecision will automatically process this new data according to the strategy rules and will show you an alert dialog box:* ***buy, sell or hold****. This dialog box also contains all alerts history.*

Strategy Alerts Customization

With the Strategy Alerts Customization functionality, you can receive alerts when the conditions of your trading strategy are met. You can receive any kind of alerts you prefer on any of the issues in your portfolio in the form of audio or visual messages or by e-mail. This will enable you to act immediately on any arising profitable opportunities.

To configure the strategy alerts settings:

1. From the **Tools** menu, select **Preferences**.

2. In the **Preferences** window, select the *Alerts* tab.

3. In the **Strategy Alert** area, you can choose the way in which the alert will be shown to you by selecting any of the following corresponding check boxes: **Play sound on Strategy Alerts** or **Send E-mail on Strategy Alerts**.

4. If you have selected the **Play sound on Strategy Alerts** check box, click **Select** to browse for an audio file on your computer.

–OR–

If you have selected the **Send E-mail on Strategy Alerts** check box, click **Setting** to configure the SMTP Sever and E-mail address**.**

An email message will be sent to you or another recipient when the set alert is triggered.

4. In the **Preferences** window click **OK**.

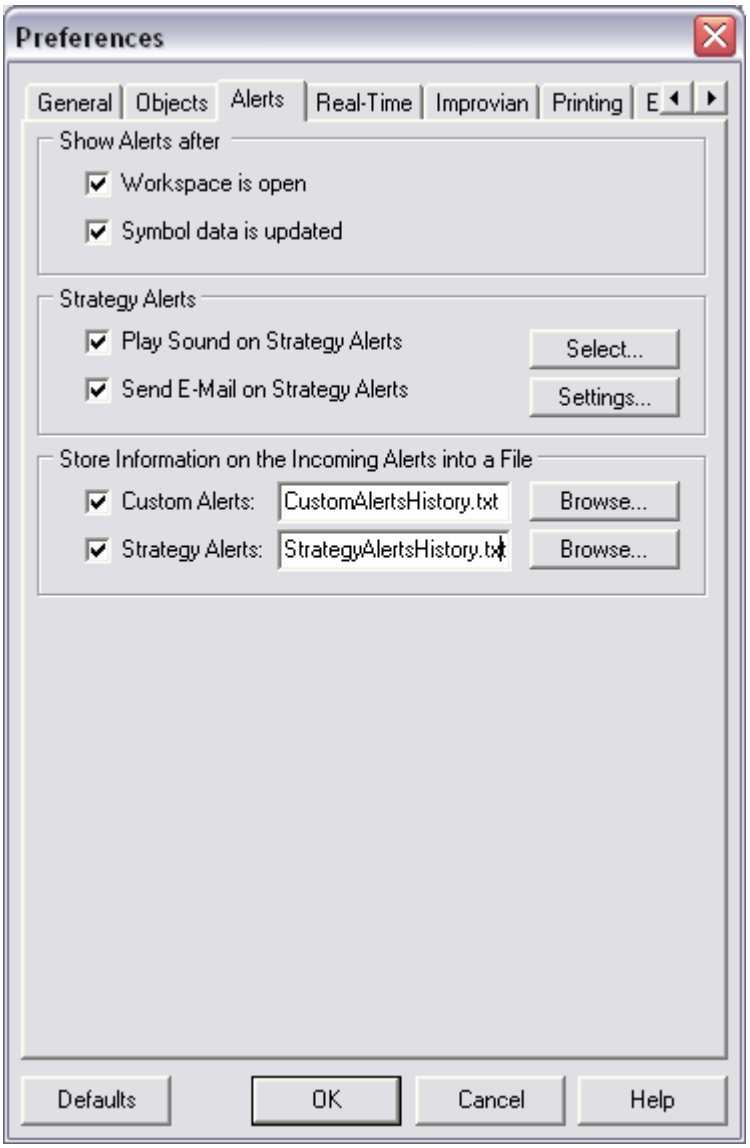
Outputting Alerts into a Text File

You can store information on the incoming alerts, both custom and strategy, into a file located on your computer. This option can be useful for receiving an output from Tradecision to be able to generate a live order using a third party application.

To select a file to store information on incoming alerts:

1. From the **Tools** menu, select **Preferences**.

   The *Preferences* tab is displayed.



2. In the **Preferences** window, select the *Alerts* tab.

3. In the **Store Information on the Incoming Alerts into a File** area, select the **Custom Alerts** and/or **Strategy Alerts** check boxes and then click **Browse** to browse for a text file(s) for storing the alerts.

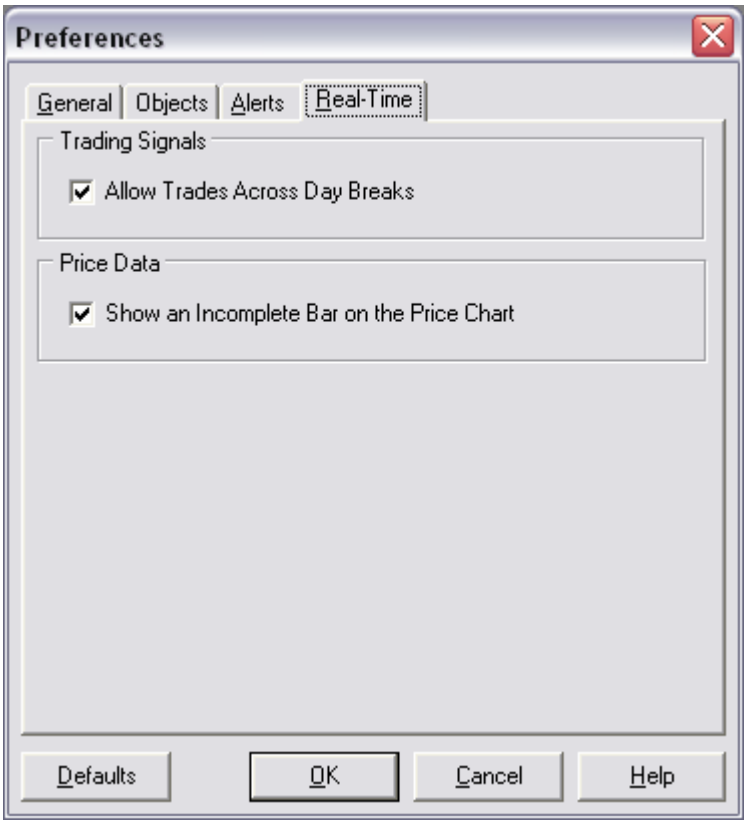
Note: *The names of the* ***Custom Alerts*** *u* ***Strategy Alerts*** *files can not be the same.*

4. Click **OK**.

The files will be created on your local hard drive and all the alerts generated by Tradecision will be stored in the text file(s).

Real Time tab (for Real Time edition only)

Duration of Trades.
In the **Trading Signals** area of the *Real Time* tab, select the **Allow trades across day breaks** check box.



Displaying an Incomplete Bar.
Select the **Show an incomplete bar on the price chart** option to enable the displaying of an incomplete bar.

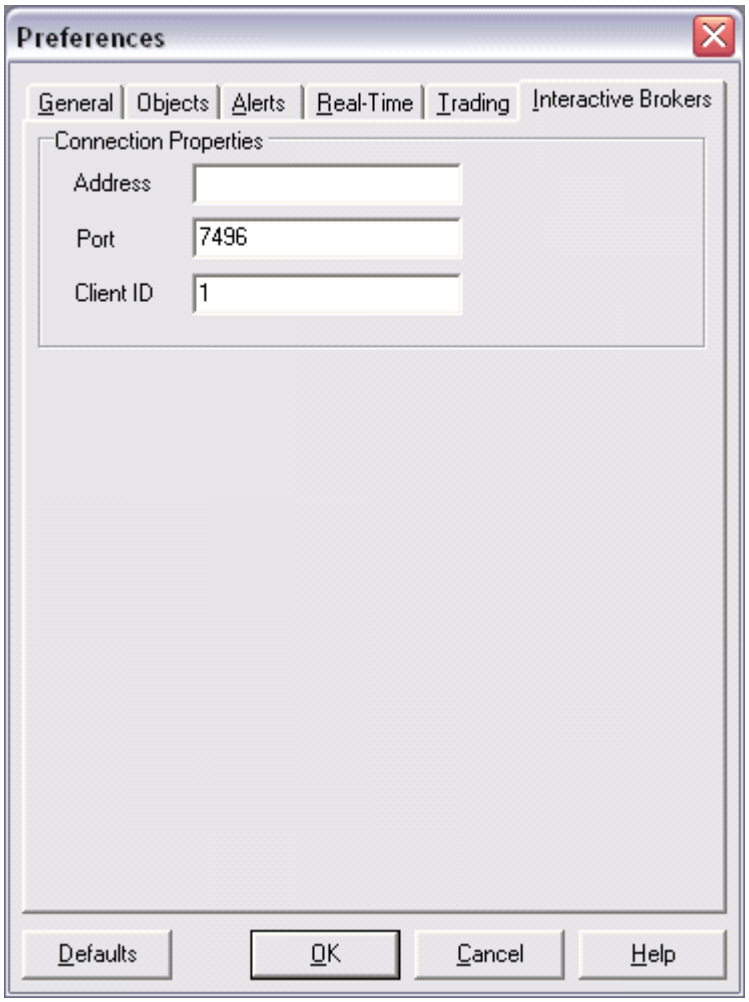
Trading Tab

The DTE mode settings are located in the **Trading** tab of the *Preferences* window.

Select Broker. Sets the broker that handles the trade.
Confirm Trading Orders. Requests user confirmation before each transaction.
Closing all positions on stop trading. Closes all open positions when the DTE mode is deactivated.

Interactive Brokers tab

The Interactive Brokers settings are located in the **Interactive Brokers** tab of the *Preferences* windows.

a. 

Address. The address of the computer on which Interactive Brokers is run; if Interactive Brokers is run on the same computer with Tradecision, this box can be left empty

Post. The port number.

ClientID. The numeric identifier of the customer. This parameter and the parameter that performs its function in Data Manager must be different for the application's correct work.

Chapter 22

Real Time Edition

Tradecision Professional Real Time is an advanced analysis and decision support trading software application for intraday traders. If you are a day trader trading stocks, futures, Forex or options, with Tradecision you get the ability to succeed.

Tradecision Professional Real-Timeenables:

- reacting to small market movements;
- identifying short-term trends;
- applying your trading strategies to minute bars; - receivimg timely strategy alerts.

Tradecision Pro Real Time is charting and analysis trading software for intraday traders. Owing to the cutting-edge technology used by Tradecision Pro Real Time, the application is capable of ensuring such a level of precision, which will enable you to identify money-making opportunities and capitalize on them in real time.

Locating Opportunities in Real-Time

Tradecision Pro Real Time adds real-time performance capabilities to the feature set offered by Tradecision Professional. Therefore, using this version of the system, you can apply your strategies and neural models to minute bars.

Upgrades

To purchase an upgrade, visit
www.tradecision/purchase/purchase_upgrade.htm

Tradecision Lite, Standard and Tradecision Professional can now be upgraded to Tradecision Real Time. This upgrade will allow you to use real-time intraday data.

Receiving Real Time Data

Tradecision Pro Real Time currently supports IB, IQfeed and eSignal real time quotes. Getting accurate streaming data enables you to look for profitable opportunities and analyze the current market conditions and trends.

You can import your MetaStock and ASCII intraday databases.

Key Features

In Tradecision Real Time, the Tradecision functionality has been expanded to include a number of new features that are narrowly tailored to meet the more demanding needs of today's investors and real-time traders:

- Streaming, real-time quotes and charts displaying custom minute charts;
- A sophisticated money management set of rules and functions;
- Portfolio-level backtesting and optimization;
- Advanced reporting system;
- Power to design multiple-security strategies and indicators in seconds;
- Multiple data feeds.

Data Manipulations

With Tradecision, you can trade any kind of securities on practically any exchange in the world:

- Real-time streaming quotes via **IB** and **IQFeed**, granting access to all US exchanges and major world exchanges.
- **eSignal** supports U.S., Canadian, European, Asian and African Level I equities, indices, CME E-Minis and CBOT Mini-Sized Futures, plus 100s of world indices.
- A user-configurable **ASCII** import wizard allows you to read quotes stored on your local hard drive in the format defined by you. Data Manager is flexible enough to import most of the date-based end-of-day and intraday price data from an ASCII file.
- Built-in **MetaStock®** database importer reads all stocks directly from your MetaStock database (in both EOD and intraday modes).
- **CSI database** is supported directly through a CSI's product, known as **Unfair Advantage®**. CSI is a low cost information vendor of summary end-of-day world financial market data. CSI's historical coverage includes all commodity markets gathered from over 80 futures exchanges traded worldwide. CSI also supplies daily summary data on all New York Stock Exchange stocks, nearly all American, and NASDAQ stocks, and virtually all 25,000 US mutual funds. The CSI market data is supplied to the most popular financial websites, such as Yahoo! Finance and MSN Money.

Strategy Execution

Whether you employ traditional technical analysis techniques, neural networks, or a combination of the two, as a strategy trader you can apply your trading systems and strategies in real time.
After you have backtested your ideas and defined a rule, Tradecision will display a buy, sell or hold alert in real time, as soon as it receives the corresponding signal.

Real Time Advanced Charting

Designed for individual investors with limited experience, as well as for active and professional traders, Tradecision displays all bars in an accurate, clear, and easy-to-see way, so that you can easily follow and analyze them.

Stock and Quote Database

Tradecision features advanced database system that offers the following:

- Build-up and store historical bar data for backtesting purposes;
- Build-up and store intraday minute-bar or end-of-day data for backtesting purposes;
- Unlimited number of stocks and quotes; Support of multiple databases.

Setting Up the IQfeed Real-Time Mode

IQfeed is a very reliable and established data provider that has clear and strict rules for obtaining market data from them.

To receive market data from IQfeed, become an IQfeed subscriber (a free trial isavailable) and download the IQfeed client.

First of all to operate with IQfeed data in Tradecision you need to subscribe to this datafeed. IQfeed offers free trial. You can get it at http://www.iqfeed.net/index.cfm?displayaction=start

Also, you need to download IQfeed client for free from http://www.iqfeed.net/index.cfm?displayaction=support&section=download

***Note**: The latest version must be downloaded.*

Configuring Data Manager

To configure Data Manager:

1. In the *Properties* dialog box of **Data Manger**, indicate IQfeed as the data source for the selected symbol.

***Note**: By default, Data Manager selects and shows E-Signal as the primary data source. You need to click **Change** to select another data source.*

To receive data from the IQfeed in the streaming mode, you also need to perform certain steps in Tradecision.

To enable Tradecision to receive real-time market data:

1. Open Tradecision.

2. Open the symbol for which you want to receive real-time data.

3. From the **Tools** menu, select **Streaming mode**.

The *IQ Connect Login* dialog box will be displayed.

4. Enter your login and password which were e-mailed to you by IQfeed shortly after your subscription.

5. Select the **Save Login and Password/Pin** and **Automatically Connect** check boxes.

6. Click **Connect** and you will be able to operate with IQfeed real-time data.

Configuring Interactive Brokers

Tradecision supports real-time streaming quotes from Interactive Brokers TWS.

Note: For details, you can refer to the quick-start tutorial How to create a symbol with Interactive Brokers Data which can be found at http://tradecision.com/product/videos.htm

To use Interactive Brokers Data in the Tradecision Data Manager you need to:

1. Download and install TWS API and then restart your computer.

Note: *This procedure is required to register TWS API ActiveX components.*

2. Run the Web-based TWS or download standalone TWS.

3. In TWS, you need to select **Configure > API > Enable Active X and Socket clients**.

Configuring Interactive Brokers in Data Manager

1. Launch the Trader Workstation (4.0 or greater).

2. Open Data Manager.

3. Go to the **Tools** menu and select **Preferences** > **Interactive Brokers** tab.

In the *Interactive Brokers* tab, you can see the state of connection between Data Manager and Interactive Brokers. If the connection indicator is green, the connection has been established successfully and you can start collecting market data. If the indicator is red, some kind of connection error has occurred. If the indicator is yellow, Data Manager is trying to connect to IB.

4. If you want to receive market data for a particular symbol, from the **Symbol** menu, select **Add New** or just click the **Add New** button on the Data Manager toolbar;

The *Add New Symbol* dialog box will be displayed.

5. To set Interactive Brokers as the data source for the symbol In the *Add New Symbol* dialog box, click the **Change** button in the **Data Source** area and then select **Interactive Brokers**.

Note: *you can use the* ***"Save as default"*** *button in order to use the same symbol properties for the symbols you will create in the future.*

Note: *Make sure that the selected symbol's Exchange is the same as in TWS. Otherwise the symbol won't receive data from Interactive Brokers.*

If a symbol is added and no errors are displayed, all the data for this symbol can now be easily downloaded and stored in Data Manager.

6. To receive and plot the data, click the **Update**.

Note: *IB (TWS) does not allow receiving historical data. Data Manager receives only real-time price information. That is why it is very important for Data Manager to be remaining active for as long as possible. The more time Data Manager and TWS work together, the larger amount of price data Data Manager will be able to collect.*

Futures Symbols

When working with futures, it is often required to indicate the Expiration Date. This can be done in the *Data Source* dialog box of a particular symbol.

To indicate the expiration date:

1. In the *Add New Symbol*, dialog box click **Change** next to **Data source**.

The *Data Source* dialog box will be displayed.

2. In the *Data Source* dialog box, select **Interactive Brokers** and indicate an expiration date in the YYYYMM format.

To start receiving data in the streaming mode:

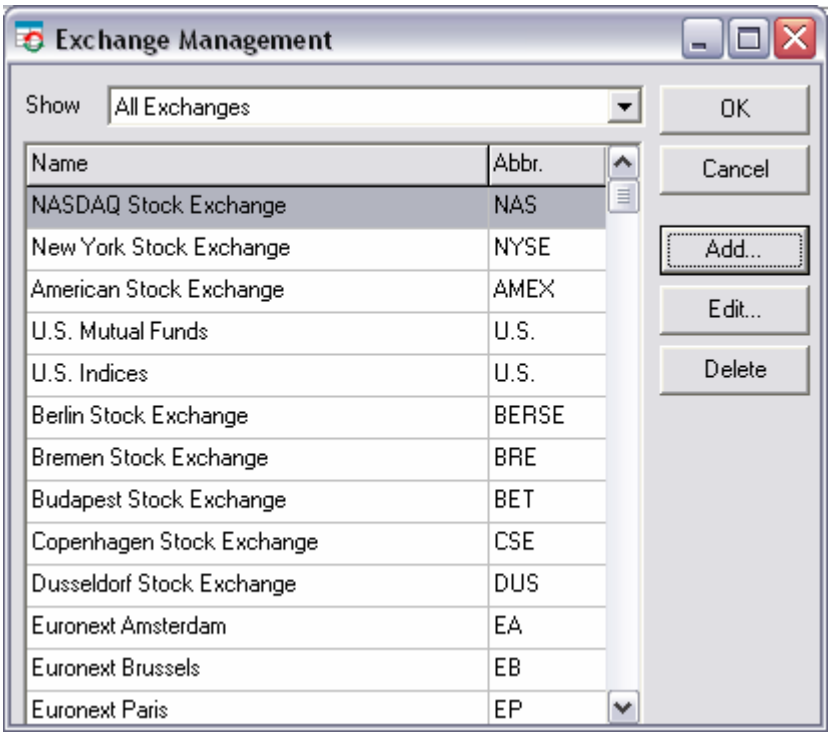
1. Select a symbol from the **Symbol List** of Data Manager, right-click it and select **Start Streaming**.

If the exchange you need is not included in the **Exchange** list of Data Manager, you can add it manually using the **Tools** menu.

To add an exchange manually:

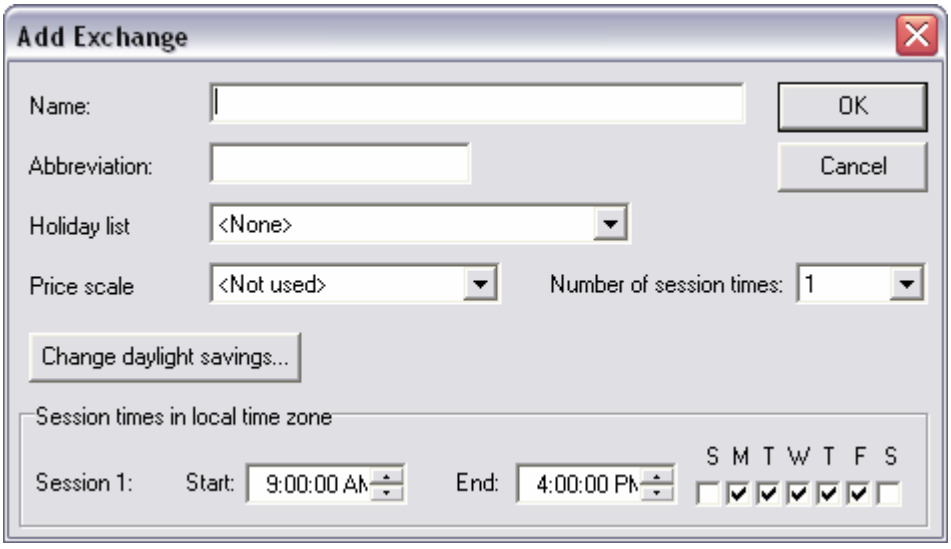
- From the **Tools** menu of Data Manager, select **Exchanges**.

In the *Exchange Management* dialog will be displayed.



- Click **Add**.

The *Add Exchange* dialog will be displayed.



- Fill in the corresponding fields and click **OK**.

- *In the Exchange Management* dialog, click **OK**.

  ***Note**: The exchange you use must contain a **Session Time** for Data Manager to be able to receive market data.*

Selecting Interactive Brokers Preferences

To configure specific Interactive Brokers preferences:

1. Open Data Manager.

2. Go to the **Tools** menu.

3. Click **Preferences** and select the *Interactive Brokers* tab.

4. Set or modify the following connection preferences:

- **Address.** If TWS is launched from a local PC, you can leave the **Address** box empty. If TWS is located on a remote machine, you must enter the IP address of the remote computer.

- **Port.** It should be the same as in TWS > Configure >API > Socket Port.

- **Client ID.** If TWS is accessed by several concurrent users, they each need to have a unique Client ID. If there is only one user, a default setting can be used.

- **Selecting Autosave period.** Data Manager automatically collects and saves data from TWS in the cached price data custom format. To indicate an autosave period for cached price data, select a desired parameter in the **Autosave period, min** list.

- The **Show messages**. With the Interactive Brokers' messages dialog box you can analyze the IB messages on its activity.

Switching on the Streaming Mode

To receive real-time data, you can easily switch to the Streaming Mode. The Streaming mode is activated by clicking the **Start/Stop Streaming Mode** icon on the main Tradecision tool bar or by selecting the **Streaming Mode** menu item from the **Tools** menu.

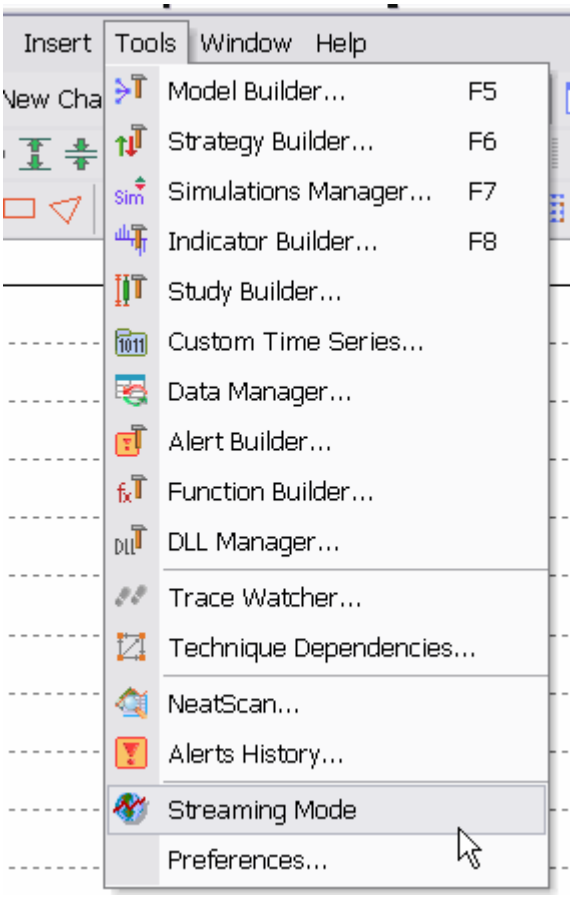
When the **Start/Stop Streaming Mode** icon is clicked or the **Streaming Mode** menu item is selected, all the currently open charts start receiving data in the Streaming mode. All newly opened charts start working in the streaming mode automatically. When the button or icon is clicked repeatedly, the Streaming mode is inactivated and canclelled for all currently open charts.

To switch to the streaming mode:

1. Open Tradecision.

2. From the **Tools** menu, select **Streaming Mode** or click the **Start/Stop Streaming Mode** icon on the Tradecision tool bar.

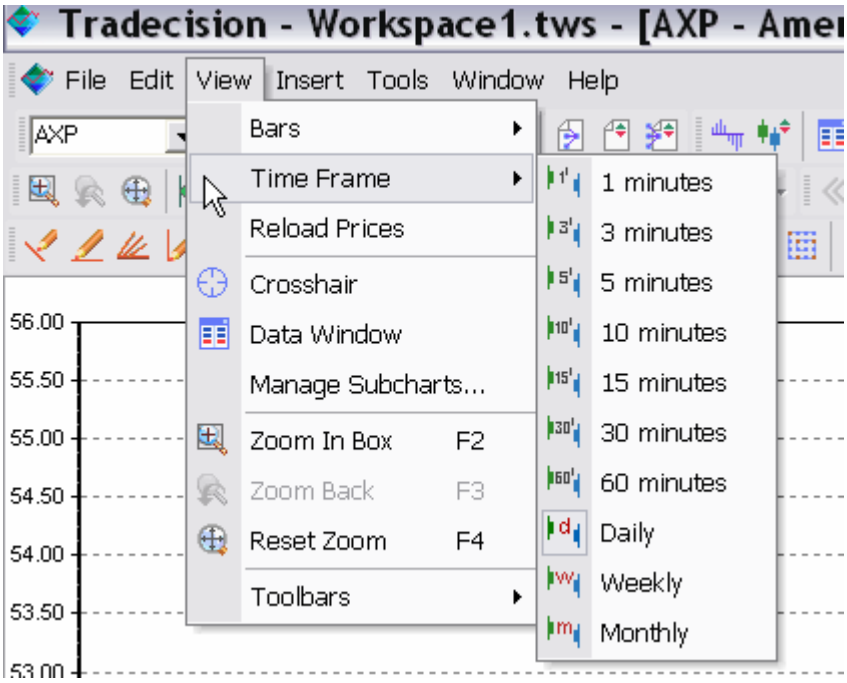
Now you can manage real-time data.



Selecting Time Frames

To change the chart time frame:

1. From the **View** menu, point to **Time frame**, and then select one of the timeframe values (**1, 3, 5, 10, 15, 30** or **60**) or enter your custom time frame using the **Minutes** toolbar.



Selecting Day Session Range

How to Specify the Chart Loading Period for a Trading Day

The Day Session Range is a data range you can use for chart analysis. The chart will only load those bars that fall within the period specified in the session period. You can specify in Tradecision which "hours" and "minutes" are permitted for analysis and entering trades.

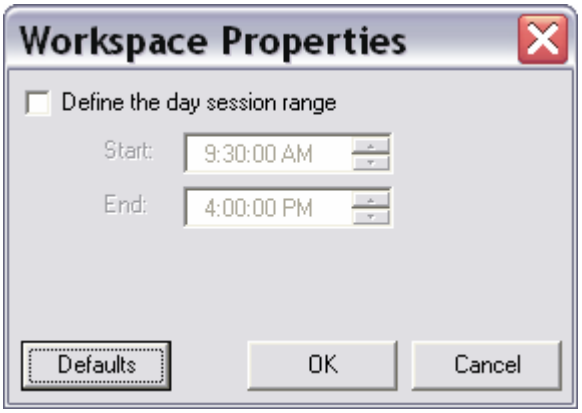
For example, if you want to use the data from 2 pm till 5 pm only, you need to select this data range and only this data range will be displayed.

FOREX traders will benefit from this feature. Since there are many pseudo "start/end" periods in which traders may want to participate, the capability will assist them in creating charts that are loaded for the opening of a specific exchange or for specific day sessions.

To define the Day Session Range:

1. From the **File** menu, select **Workspace Properties**.

The Workspace Properties dialog box will be displayed.



2. From the *Workspace Properties* dialog box, select the **Define the day session range** check box and select the appropriate values in the **Start** and **End** boxes,

-OR-

Click **Default** if you want to use the default parameters.

***Note**: By default, the system will set 9 am – 4 pm.*

3. Click **OK**.

***Note:** This option will be applied to the current workspace even if it has not been saved yet.*

4. To close the dialog box, click **Cancel**.

Allowing Trades Across Day Breaks

Most day traders do not carry positions overnight. However, in intraday trading it is possible, where one enters during a day session but exits, upon a signal, 2 to 3 days later.

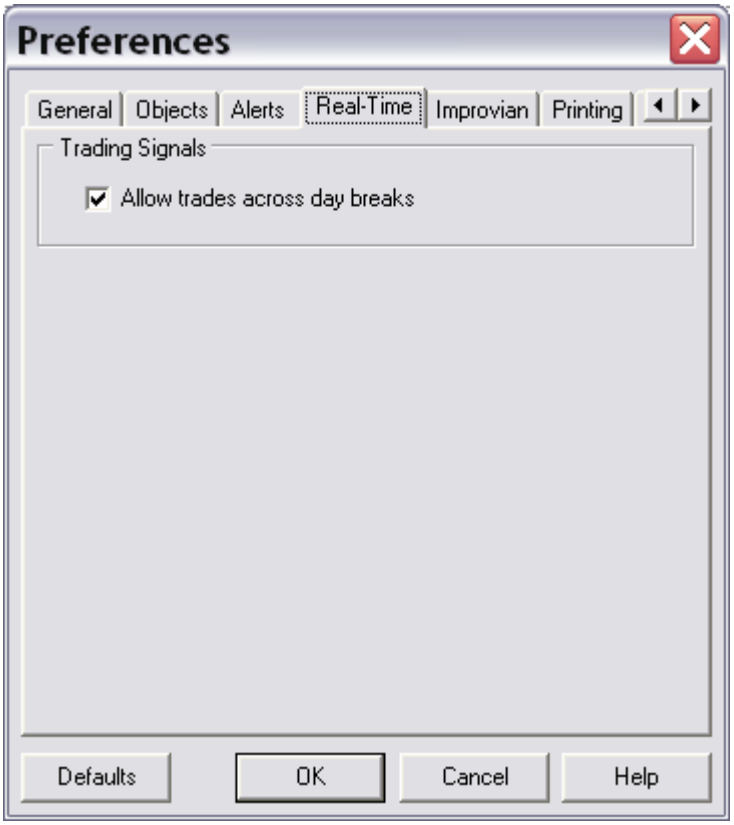
Note: When you apply your strategy, Tradecision will forcibly generate the exit signal at the end of each day.

To define the overnight/day trading conditions:

1. From the **Tools** menu, select **Preferences**.

2. In the **Preferences** dialog box, select the *Real Time* tab.

The *Real Time* tab will be displayed.



3. In the **Trading Signals** area, select the **Allow trades across day breaks** check box.

4. Click **OK**.

Chapter 23

FAQ - Frequently Asked Questions

Get quick answers to the most frequently asked questions about Tradecision

Q. How can I try the software before I buy it?

A. We do not offer any demo or trial version. We offer a 30-day money back guarantee. If you are not satisfied with our software, you can return it within 30 days and get your money back. Additionally, you can find a great deal of information on our product on our website.

Q. What is a "30-Day Money Back Guarantee"?

A. If, for any reason, you are not 100% satisfied with Alyuda's Tradecision, you can obtain a refund of the full amount of your payment within 30 days following the key activation.

Q. How can I determine that the software is right for me?

A. If you need a robust technical analysis tool to test your trading ideas before actually using them, and if you have been disappointed by other specialized technical analysis or neural network software as being too complicated to use, Tradecision is for you.

Use Tradecision to make better trading decisions in your everyday trading. You can use it for any of the following tasks:

Charting with easy-to-use drawing tools;
Analyzing price data with indicators and analytical studies;
Developing and testing trading systems based on neural networks and technical indicators;
Forecasting market moves and turning points to act before others;
Using genetic algorithms for fast and efficient trading system optimization.

Q. What are the strengths of your software?

A. Whether you're a beginning investor or veteran trader, Tradecision provides you with the practical and advanced collection of tools to support your trading decision-making process.

The following Tradecision's strengths are at your service:
Power of both traditional technical analysis and artificial neural networks in a single software package.

Easy-to-use technology and GUI. With Tradecision, you can employ advanced technology without the need to learn any new theoretical or scientific details.

Accurate constructive neural networks for making predictions and composing neural strategies.

Point-and-click Money Management Editor, allowing you to easily use and customize the most well-known position size, stop-loss, trailing stop and profit target rules.

Powerful strategy development and testing capabilities. Strategy Builder, a powerful language, Optimization Wizard and Simulations Manager, providing portfolio testing and detailed reporting capabilities.

Fast optimization with Genetic Algorithms. The system will allow you to automatically find the best inputs for neural networks, the number of the trading strategy parameters to be optimized being unlimited.

Extensive list of analytical studies and indicators. Support your trading decisions with over 100 technical indicators, auto-trends, chart patterns, Elliott waves identification, and other analytical studies. Any kind of analysis made using Tradecision is exceptionally accurate. This makes the application a great tool for active and professional traders.

Q. Which would be better for me to purchase - Standard or Professional Edition?

A. It depends on a number of factors, including your approach to trading, your need for using advanced tools and your desire to improve your trading experience.

With Professional Edition, you get the following significant advantages:

Ability to create your own custom indicators.
Since trading technologies and technical analysis are constantly developing, it is very important that this tool be used for experimenting and creating up-to-date, effective indicators.

Neural Models optimization with Genetic Algorithms.
Use Genetic Algorithms to find the best neural model inputs and their parameters. Genetic algorithms combine the best characteristics of the other optimization methods, such as robustness and fast convergence, which does not depend on the properties of the optimization criteria (such as, for example, smoothness). At the same time, Genetic Algorithms are much faster than exhaustive search.

Perform a strategy optimization with Genetic Algorithms.
The optimization process can take seconds, minutes or hours, depending on the number of simulations being run. To reduce the time required for optimization, you can either reduce the number of optimization parameters or use Genetic Algorithms for optimization. For those cases when you have a large number of optimization variables and wide search ranges, Genetic Algorithms are much faster than exhaustive search while remaining very robust.

Q. Can you guarantee I will become rich after buying your software?

A. No, we cannot Alyuda Research designed the analytical Tradecision software application in order to support YOUR OWN profitable trading ideas and significantly improve your trading experience. By automating neural network analysis, intuitive charting and money management, as well as by offering proven technical analysis tools, Tradecision gives traders the power to make fast and profitable decisions.

Experts say that no software will help you become rich if you lack discipline, sound cash management, risk control and profitable trading strategy(ies).

Q. Is it really so easy to make a profit?

A. This one isn't so easy to answer. Tradecision is not a "system" or predefined trading strategy making money for you. It is a powerful tool that helps you create and test your own winning trading systems powered by proven technical analysis tools and the latest AI achievements. You should understand that being a great trading software application, Tradecision, just like any other software, does not provide magic bullets or Holy Grail trading systems.

Q. What makes Tradecision different from other trading software in the market?

A. In Tradecision, the Alyuda Research team has applied its thorough knowledge and expertise in developing efficient trading software and artificial neural networks.

The following are the powerful advantages of the application:

- Neural network predictions and strategies;
- Wizards' guidance;
- Advanced Money Management editor;
- Powerful language;
- Fast optimization with genetic algorithms;
- Elliott Waves Analysis.

In addition, Tradecision has passed numerous extensive tests and improvements allowing professionals to speak of a new and reliable piece of software hitting the market.

Q. Is Tradecision easy to use?

A. Yes, it is. It is both easy to learn using and use on a daily basis. Tradecision was designed to be as intuitive and user-friendly as possible. To work with Tradecision, you do not need any previous trading software and/or neural network experience. By using the application's intuitively

user-friendly interface you will become familiar with Tradecision right from the first click.

Q. Can I install Tradecision on multiple computers?

A. You may only:

- install and use one copy of the Software on a single computer.
- you may also make a second copy of the Software, install it, and use it on a home or portable computer used exclusively by you.
- make one backup copy of the Software, provided your backup copy is not installed or used on any computer.

For intensive back testing studies, optimizations, multi-input neural models and charts containing multiple objects, we recommend 3GHz Pentium 4 processor and 1GB of RAM.

Q. Has Tradecision any help materials?

A. Yes, it does. Tradecision contains a lot of help materials. Every dialog in Tradecision contains the Help button. When the Help button is clicked, Tradecision displays a window containing detailed information on the dialog or feature.

Q. What about support? How long does your technical support last and how much does it cost?

A. All registered users are entitled to free technical support without time limits. There are no limits on the number of requests either. We will provide prompt and detailed answers to all your questions. Our support team is dedicated to helping you succeed in improving your trading decisions with our software.

Q. Will I pay for the products just once or monthly/annually?

A. No, you will not You are charged just once – when you are purchasing the software.

Q. Which markets can I trade using Tradecision?

A. With Tradecision you can trade stocks, FOREX and futures.

Q. Why are you selling the software instead of making $$$ using it?

A. Several professional traders work on our team as consultants. They successfully trade using the Alyuda software sharing their trading experience and market knowledge with us. The company's employees also successfully use Tradecision but they do it on a private basis only and during non-working hours.

As a company, Alyuda does not engage in any kind of trading because it focuses on Artificial Intelligence research and software development.

We do what we like doing the most: solve difficult real-world problems using neural networks. Just like in any other industry, there are companies that build and sell tools, and there are those that use these tools.

Q. I would like to get more info about Alyuda.

A. Alyuda Research helps traders, managers and data analysis specialists leverage the power of artificial intelligence. Since 2001, Alyuda has been successfully developing and marketing software products based on neural networks and other AI technologies.

Today, owing to Alyuda's software products, thousands of business analysts, traders and engineers enjoy the benefits of AI. Visit Alyuda's web-site at www.alyuda.com for detailed information on the company.

Q. I am a beginner trader. Couldn't you please recommend a resource for traders where I can find some valuable information?

A. Yes, we could. Below you will find links to Internet resources that as we believe will be of help.

Data vendors:
http://www.esignal.com
http://finance.yahoo.com
http://www.csidata.com
http://www.reuters.com

Forums:
http://www.elitetrader.com

Magazines:
http://www.traders.com

Finance world:

http://online.wsj.com
http://finance.yahoo.com
http://www.thestreet.com

http://www.barrons.com
http://finance.lycos.com/qc/default.aspx/
http://cbs.marketwatch.com
http://smartmoney.com
http://www.forbes.com
http://www.fool.com
http://moneycentral.msn.com
http://dmoz.org/Business/Investing/Research_and_Analysis/
http://dmoz.org/Computers/Software/Business/Investing/

Stock Exchanges:
http://www.nasdaq.com
http://www.nyse.com

Q. Can I work with Candlestick Chart?

A. Yes, you can. Just click the Candlestick Chart button on the toolbar.

Q. Can I work with Point & Figure Chart?

A. No, you can't. Tradecision does not support working with Point & Figure Charts.

Q. Can I work with weekly/monthly charts?

A. Yes, you can To change the chart time frame, on the Time frame of the Chart menu, then select the daily, weekly or monthly time frame.

Q. Can I display the charts of two or more different stocks at the same time?

A. Yes, you can You can add new chart windows to the current workspace with chart(s).

Also, you can resize chart windows, manage indicators, sub-charts, analytical studies, and your own trading ideas, and then save them on your local hard drive. Tradecision saves a workspace with your defined stocks in a file with extension Tradecision Workspace (*.tws).

Q. What should I mark with buy/sell markers?

A. In Tradecision, the Buy marker and Sell marker are drawing tools used to mark out specific parts of a chart you believe to be important. Using the markers, you can denote specific occurrences, such as the bar you purchased a stock, sold a stock, identified an uptrend, and so on.

You can use markers in conjunction with analytical tools. For example, there is always a period of time between a trading strategy generating an order and filling that order. This difference in price is known as slippage.

To determine the average slippage amount, you can insert a marker, indicating the actual bar that your position was filled, and then calculate the difference between the point in time when your orders are generated in accordance with your strategy and the point in time when they are filled.

Q. What are Fibonacci Retracements?

A. Fibonacci Retracements help anticipate support and resistance levels along with price targets. Fibonacci Retracements indicate the possible support and resistance levels from important highs and lows. The distance between the start and end points is divided into Fibonacci Retracements, which suggest possible support and resistance points.

The Fibonacci Retracement tool is used to measure the amount the market has retraced compared with the overall market movement. When used together with Elliott waves, Fibonacci Retracements are normally drawn from the beginning of Wave 1 (the Zero point) to the top of Wave 3 to find a target price area for the Wave 4 retracement.

You should keep an eye out for the end of a trend or correction at the Fibonacci Levels. Horizontal lines are drawn at the common Fibonacci levels of 38.2%, 50%, and 61.8%. As the price retraces, support and resistance often occur at or near the Fibonacci Retracement levels .

Q. How many sub-charts can I open?

A. You can use up to 6 visible sub-charts with indicators.

Q. Can I save my charts with modifications the way I like?

A. Yes, you can. This can be done using workspaces.
Workspaces provide a convenient way to manage charts and organize your investment ideas. Workspace itself is a single file that contains all the charts with their drawing objects, indicators and studies.

Workspace is a single file that contains all the charts with their drawing objects, indicators and studies. When a workspace is opened, each chart is opened and displayed on the screen exactly the way it appeared when the workspace was saved, including all the chart's elements. When you save a workspace, you save all your changes and modifications in all active charts.

You can create a separate workspace for your favorite stock, a group of stocks, an industry or anything you decide to work with together. For example, you may want to analyze QQQ and Dow along with four of your favorite indicators. Or you may want to save the current positions of windows with all their elements. The best way to save your time and manage groups of charts/sub-charts/objects is using workspaces.

Once you have created a workspace, you can add new chart windows to the workspace, manage charts, indicators, sub-charts, analytical studies, as well as many other trading ideas, and then save them on your local hard drive.

You can work with one workspace at a time.

Tradecision saves a workspace in a file with the Tradecision Workspace extension (*.tws)

Q. Could you tell me what the Elliott Waves Theory is about?

A. In 1939, Ralph Nelson Elliott published a pattern-recognition technique, which holds that the stock market follows a rhythm or pattern of five upward waves and three downward waves to form a complete cycle of eight waves. The three downward waves are referred to as a "correction" of the preceding five upward waves.

Wave is a movement in the market, either upwards or downwards. The size of the wave depends on the period of time that is being analyzed. Impulse Wave is a wave that moves in the direction of the main market trend. It subdivides into 5 smaller waves (1-2-3-4-5). Waves 1, 3, and 5 move in the direction of the main market trend. Waves 2 and 4 move against the main market trend.

Corrective Wave is a wave that moves in the direction opposite to the direction of the main market trend. It subdivides into 3 smaller waves (a-b-c). Waves a and c move against the main market trend. Wave b moves in the direction of the main market trend.

Q. How does Tradecision Elliott Waves?

A. Tradecision's Elliott Wave study uses the simplified Elliott Wave theory that states that price usually makes a 5-wave pattern in one direction, followed (in most cases) by a corrective pattern, and, finally, by a new 5-wave pattern in the opposite direction.

The Tradecision Elliott wave study uses a special mathematical algorithm to resolve conflicting situations and identify waves and corrections as precisely as possible. Experts can fine-tune this algorithm. For example, it's possible to specify a parameter that indicates the percentage for which Wave 4 can overlap Wave 1 before the Wave count is considered invalid .

Q. Where I can read about the description of indicators?

A. Tradecision's Help contains a library with a description of the 100 + most popular built-in indicators, including MACD, RSI, Stochastic, PercentR, Bollinger Bands, Average True Range, and others.

Q. What is Fibonacci Clusters?

A. Using Fibonacci Clusters you can determine the probability of a trend reversal for each price level. Fibonacci Clusters indicate the price level on which a potential change in the trend may occur. The stronger the cluster, the greater the likelihood that the price level is a support or resistance level for the current trend.

Fibonacci Clusters were not designed to be used alone. They should be used as a confirming indicator or for gauging where in a trend a change may potentially happen.

Fibonacci Clusters are calculated using the following procedure: the price range of a security is divided into a specified number of sub-ranges (clusters). After that, Tradecision uses all pivots (minor, intermediate and major) to form all possible Fibonacci Levels (Retracements and Extensions). The more Fibonacci Levels are assigned to a cluster, the stronger the cluster is

Q. Can I build my own indicator?

A. Yes, you can. Tradecision affords you the opportunity to create and improve your own custom indicators. Since the trading technologies and technical analysis are constantly developing, it is very helpful to use this tool for experimenting and creating up-to-date advanced indicators.

A custom indicator can be a combination of other indicators. Some well-known indicators are simply a combination of other indicators. For instance, Chaikin Oscillator is a subtraction of a 10-period EMA of Accumulation-Distribution from a 3-period EMA of Accumulation-Distribution, and TRIX is a combination of 3 Exponential Moving Averages.

You can create or edit your own custom indicators using Indicator Builder.

Q. Can I use data and indicators from 2 stocks in one neural study? I think qqv will be helpful while predicting qqq.

A. To do this, you need to use External function

Q. Is it really so easy to build a profitable strategy based on neural forecasting?

A. The Tradecision interface is very easy-to-use and all the scientific details are hidden inside the application. With Tradecision, you can use the most advanced technology without the necessity to spend your time on getting familiar with the latest AI achievements. You don't need to have any mathematical or artificial intelligence background to effectively use the software.

However, you need to be persistent and ready to experiment, since different markets and stocks require different inputs and strategies. You should be prepared to spend some time on preparing your neural models.

Technological specifics, such as neural network architecture and training algorithms, data preprocessing, and so on are completely automated but you still have to select the necessary data, verify your ideas, adapt models to changing market situations. You will have to rely on your own judgment while assessing system performance or selecting the best model based on your trading style and risk preferences.

Tradecision is not a ready-made strategy but rather an advanced tool that offers you a significant advantage over other traders. It helps you obtain accurate forecasts and build winning strategies based on the latest achievements in the artificial intelligence technologies.

Q. Why can neural networks be better than other technical analysis techniques?

A. A neural network can process a huge amount of data and detect those trends and price patterns that cannot possibly be seen in charts by humans or discovered using the traditional technical analysis methods.

Neural networks learn from price data and discover complex non-linear dynamic patterns in price movements. Unlike typical indicators, neural networks have the ability to learn from the data itself. Neural networks learn the patterns of price data whereas standard analysis techniques assign a model form to the data and then test it to determine whether the data fits the assigned structure or not.

A very often, regular trading systems work for a while until the market situation changes, causing the system performance to deteriorate. A neural network-based trading system can be retrained every time you have new data and thus be adapted to any new market situations.

Q. What are neural networks?

A. An artificial neural network consists of a large number of simple processing units linked by weighted connections. By analogy, the processing units may be referred to as neurons. Each unit receives inputs from many other units and generates a single output. The output acts as an input for other processing units.

The power of a neural network stems from the combination of multiple units in a network. A certain network can be tuned to solve a specific problem by modyfing the connection topology and values of the connecting weights between its units.

Neural networks have proven to be among the best methods of detecting hidden relations in stock market data. Once a neural network has analyzed your dataset (i.e. "has received training"), it is able to make predictions based on the hidden dependencies that have been found.

Q. Do I need the knowledge in neural networks / programming / statistics / artificial intelligence to effectively use your software?

A. The Tradecision interface is very easy-to-use and all the scientific details are hidden inside the application. With Tradecision, you can use the most advanced technology without the necessity to spend your time on getting familiar with the latest AI achievements. You don't need to have any mathematical or artificial intelligence background to effectively use the software. In fact, you will be ready to use your first neural model several minutes after you started using the application. However, you need to be persistent and ready to experiment, since different markets and stocks require different inputs and strategies. You should be prepared to spend some time on preparing your neural models.

Q. What level of accuracy should I expect while making predictions about out-of-sample stock data?

A. The majority of neural models, provided they been fed the right amount of data and relevant inputs, forecast with 60-85% accuracy. Out-of-sample accuracy and forecasting errors are reported after you perform walk-forward testing of your model.

Q. What information should I feed into a neural model to achieve good forecasting results?

A. Tradecision requires a set of input columns to base the neural model training on, and identify price patterns and relationships. All data that as you believe significantly affects the value of the target or represents the market situation should be used as inputs. This includes price data (open, high, low, close and volume), technical indicators (moving averages, lags,

MACD, RSI, PercentR, and so on) market indexes (S&P500, Dow Jones Industrial, NASDAQ, and so on), as well as relevant stocks and other information that represents the market conditions.

Inputs are the only kind of knowledge about the market that will be available to a neural model to base its forecasting on. Therefore, selecting the right inputs is the trader's most important task as the rest of the tasks in Tradecision are automated.

It is worth a mention, that irrelevant or insignificant inputs may deteriorate the model's performance.

Another important aspect is the right amount of data. If your historical data has a small number of price patterns, the neural network will not have enough information about your market to train correctly. For daily bars, it is recommended that you have price data for at least 4-6 years (1000-1500 bars) for the network training and for at least 6 months for the walk-forward testing.

Too much data may increase a neural model's training period but will not improve the forecasting quality. Additionally, some old price patterns will simply not be valid in the current market situation. Therefore, to reduce the input dataset you need to remove the oldest data.

Q. What types of neural networks are used in Tradecision?

A. Tradecision uses constructive neural networks. Having spent years on research, we have discovered that some types of constructive networks often outperform the other ones in stock market forecasting. Their main advantage is their easy adaptability and precision. Constructive nets grow and train themselves during iterative price data analysis.

Q. What is the target column?

A. The target column is a column that contains history for the value you have been trying to forecast. For example, if you are trying to make a three-day forecast of Close price , the target column will be Close.

Q. What is a trading system and what is it for?

A. A trading system (or strategy) is just a set of rules that unambiguously tell you how you should trade. A trader should strictly follow a trading system he has opted for. A sound trading strategy includes entries, exits, and stops, as well as sound cash management rules.

This set of rules shouldn't vary subjectively from day to day based on broker recommendations, friends' tips or emotions, and, therefore, can be tested on past data to understand objectively how profitable, reliable and suitable to your trading style these rules are.

A system approach to trading is an integral part of trading as a profession. Every professional trader has his personal trading approach, personal preferences and his own view on risks & profit.

We cannot offer advice on the kind of trading system that should be chosen. Only you know what you need to improve in your trading to achieve good results.

Therefore, it will be up to you to decide what should be included in your personal trading plan.

Q. Can I use back-testing in Tradecision?

A. Yes, you can. With Tradecision Strategy Builder, you can create a workable trading strategy and then historically test it to see how it works.

Prior to helping you effectively use your trading account, Tradecision will secure you against the perils of real trading by performing a precise and realistic trading simulation.

Simulations Manager allows you to realistically simulate your strategy on one or several stocks simultaneously. Once your strategy is simulated, you can analyze it strategy using buy/sell signals placed on a chart.

The Strategy Performance Report will provide detailed information on the profitability of the strategy, risks involved, results of time analysis, and more.

Additionally, you can receive the Trades report, providing more than 10 ratios for each of your trades as well as the Equity and Drawdown curves.

Any flaws of your trading system you have detected can be corrected. The strategy can then be tested over again until you feel confident in using it for making your future trading decisions.

Q. What is the Strategy Performance Report?

A. The Strategy Performance Report assists you in analyzing a strategy, as well as in evaluating its suitability to your trading style and risk preferences. The report provides over 100 performance parameters that can be used to analyze a strategy.

The Strategy Performance Report contains 7 sections:

Summary (including Net Profit, Return on Initial Capital. Gross Profit, Gross Loss, Profit/Loss, Commissions paid, Account Size Required, Return on account).

Trades (including Number of profitable trades, Number of losing trades, Average profitable trade, Average ratio, Average trade, Average days in profitable trades, Maximum number of days in profitable trade and more).

Return (including Initial Capital, Final Capital, Return on Initial Capital, Return on Max Drawdown, Buy & Hold return, Annual rate of return, Buy & Hold annual rate of return).

Risk (including Gain to Pain Ratio, Sharpe Ratio, Return Retracement Ratio, Max Equity Drawdown, Net Profit / Largest Losing Trade, Net Profit / Max Drawdown).

Drawdown and Run-up (including Max Drawdown, Average Drawdown, Max Run-up, Average Run-up).

Outlier Trades (including Positive outlier trades, Negative outlier trades, Total outlier trades).

Time Analysis (including Trading period, Bars in the market, % in the market, Bars out of the market, Average time in trades, Average time between trades).

Q. What is strategy simulation?

A. Before you risk your trading account, Tradecision can perform a realistic trading simulation and inform you about the performance of your trading ideas.

Strategy analysis is a vital stage of the strategy development process. When you insert your strategy into an active chart, a new simulation is automatically created and all performance reports are generated and stored in the Simulations Manager. This is the fastest way to simulate and analyze a strategy.

With the New Simulation Wizard, you can simulate one strategy with different symbols at once. Moreover, within one run of just one simulation you can back-test several strategies with one symbol. In both cases, you can easily compare the results.

Simulations Manager enables easily creating, running and storing any number of simulations.

Q. What is a strategy optimization?

A. Optimization is the process of performing multiple tests while varying the parameters used in the strategy rules or indicators. The purpose of optimization is to discover the most profitable settings for a specific indicator or rule when applied to a specific security.

Optimization can greatly expand your knowledge of each strategy and your competence in what works in different types of markets. Optimization allows you to experiment with the parameters of your strategy without changing its main functions.

When you have tested the strategy and are confident enough about its profitability, only then it will be the right time to start optimization.

Q. How can I manage my trading strategies?

A. Part of the Tradecision functionality is Strategy Builder - a convenient tool for managing your trading strategies. You can create, edit, copy, or delete a strategy, insert a strategy into a chart, and perform strategy simulations or optimization.

Q. What is the Improvian Language?

A. Improvian is a full-featured programming language. It gives you a variety of opportunities to implement your own trading ideas. For example, you can design a trading system or improve an existing study or indicator.

Tradecision makes it easy to limit losses by coding the trading rules using the powerful features of Improvian. It is possible to create custom functions, call DLL functions, and import trading techniques from EasyLanguage and MetaStock. For creating advanced trading techniques, the new language allows traders to use variables, inputs and skip words.

Q. Its pretty hard to learn using the Improvian Language, isn't it?

A. No, it is not. The Improvian Language is a formal method with a strictly defined but rather easy-to-use syntax. Tradecision provides a detailed language help file, containing numerous examples and descriptions.

Q. Why using money management rules is important for me?

A. Sound money management and risk control are the key factors in being a profitable trader. When setting up a trade, it is essential to define the amount of risk that you are going to allow for this trade. That means taking control of the position size, stop loss and profit target before entering the market! That is why the conditions for closing out (exiting) a trade are more important than the entry conditions.

When you take a proper money management approach, you are never afraid of your losing your account.

Q. What kind of money management rules can I use with Tradecision?

A. For your convenience, the most popular money management rules are predefined and easily accessible with an advanced point-and-click editor:

- Position size can be automatically calculated using Optimal F, Kelly, Fixed Fractional Trades and Williams formulas;
- Several stop-loss rules can be applied with a couple of clicks;
- Trailing stop rule can also be easily defined as a combination of predefined conditions;
- You can also opt to use a predefined Profit Target.

To test your own money management rules, you can define them using the Improvian Language. The New Strategy dialog box contains special controls for defining and editing your stop-loss, trailing stop and profit target rules. You can create the same or separate rules for long and short trades. For more information on Strategy Builder, see Working with Strategy Builder.

Q. What are the Optimal F, Kelly, Fixed Fractional Trades and Williams formulas?

A. The following formulas are available for dynamic position size calculation:

Optimal F formula. This method of estimating the optimal risk percentage has been improved by Raplh Vince. While Kelly's formula use only the average values from the past trades, Raplh Vince proposed to take into account all trades.

Kelly formula - defines the optimal percentage of risk that should be allowed to maximize the "usefulness" function presented as a logarithm of the capital.

Fixed Ratio formula. A common problem of all those methods that use a fixed fraction of the capital is they either maximize the capital growth

without taking the risk into account (i.e. the optimal f) or minimize the risk (i.e. expose to the risks not more than x% of the capital).

Trying to solve this conflict Ryan Jones came to the conclusion that the relation of the number of lots traded to the capital growth required for increasing the number of lots by one (or by the minimum increment) should be a constant .

The Larry Williams formula. A variation of the fixed ratio method recommended by Larry Williams. The position size in units/lots is calculated as follows:

*% risk * Capital / (- Max_Drawdown) / 100.*

Q. What is a Trailing Stop?

A. A trailing Stop is a stop-loss order that follows the prevailing price trend.
This rule allows a trader to set a limit on the maximum possible loss without setting a limit on the maximum possible gain.

Q. What kinds of data feeds does Tradecision support?

A. The Data Manager subsystems support receiving data from several data sources:

• Built-in downloader provides a quick way of receiving free end-of-day quotes from major US and International exchanges through Yahoo Finance data provider.
• User-configurable ASCII import wizard allows you to read quotes stored on your local hard drive in the format defined by you.
• Built-in MetaStock® database importer reads all stocks directly from your MetaStock database.

Q. How can I import MetaStock data?

A. You can import the entire MetaStock database (symbols and their data) using the following procedure:
From the File menu, select Import MetaStock database.
2. In the Folders' view dialog box, select the folder that contains the MetaStock database.
Click Import.

Q. I have problems with importing data from ASCII files. What am I doing wrong?

A. Data Manager is flexible enough to import most date-based end-of-day price data. However, there are the following restrictions:
Only one Date column is allowed;
Information or blank lines between the lines of price data are not allowed;
Information following the last line of data is not allowed (i.e., total or summary information at the bottom of the columns);
Column names for date, open, high, low, close, volume and open interest must be labeled D or Date, O or Open, H or High, L or Low, C and Close, V or Volume and Open Interest or OI, correspondingly.

Q. How to import data from ASCII files?

A. To import data from an ASCII file:
In the Symbol List, select a symbol, the data for which you want to import;
From the File menu, select Import symbol data and then click From text file;
Locate the ASCII file with the price data, click the file name and then click Open;
In the Field order box of the New Import From Text File dialog box, select the field order you need.
In the Delimiter box, select the data delimiter that you have in the text file: Comma, Semicolon, Point, Space, or Tab Character.

Note: The First data row box allows selecting the number of the row from which your data will start in the text file. Select the Preview check box to verify in the preview pane that your data is parsed correctly.
Click Import.

The price data will be imported into the internal database.

Q. What are the key capabilities provided by Tradecision Real Time?

A. This version provides:

- All the techniques used in the regular version of Tradecision, with the ability to be used in real time.
- Streaming, real-time quotes and displaying of 1-, 5-minute intraday charts.
- Intraday data from IQfeed.
- Import MetaStock and ASCII intraday databases.

Q. How can I select the streaming mode?

A. The data-streaming process is started and stopped by clicking the Start/Stop data streaming mode button on the toolbar.

Q. Where my real-time data will be saved?

A. Intraday data collected from real-time data provider(s) is kept locally on your hard drive. The data may require a large amount of hard drive space, depending on how many securities you are following and the periodicity you prefer.

Q. What real-time data feeds will be supported in the future versions?

A. We are planning to add Quote.com and Prophet.net.

Q. Can I import intra-day data from a text files?

A. Yes, you can. You just need to have this file on your local hard drive. You will able to import the required data with the help of the Import Files Folder command or by changing a symbol's data source in Data Manager. All new records will be imported automatically from the corresponding file/folder when you click Update or Update Alll.

Keyboard Shortcuts

This page describes the keyboard shortcuts that are available in Tradecision.

The Main Window and Charts

New chart	Ctrl + N
Open workspace	Ctrl + O
Save workspace	Ctrl + S
Close Chart	Ctrl + F4
Close Workspace	Ctrl + Shift +F4
Next chart window	Ctrl + Tab
Previous chart window	Ctrl +Shift+ Tab
Scroll chart right	Right arrow **OR** “Mouse Wheel Down”
Scroll chart left	Left arrow **OR** “Mouse Wheel Up”
Scroll chart to the 1st bar	Home
Scroll chart to the last bar	End
Scroll page left	Ctrl + Left arrow, Ctrl + Mouse Wheel Down
Scroll page right	Ctrl + Right arrow Ctrl +Mouse Wheel Up
Increase bar spacing	“+” **OR** “Shift + Mouse Wheel Up”
Decrease bar spacing	“-“ **OR** “Shift + Mouse Wheel Down”
Increase bar height	Ctrl + Up Arrow
Decrease bar height	Ctrl + Down Arrow
Time frames	Ctrl + “1” … Ctrl + “0”
Reload prices	Ctrl + Shift + R
Crosshair On/Off	Ctrl + Shift + C
Data Window	Ctrl + Shift + W
Manage subcharts	Ctrl + Shift + S
Zoom in box	F2
Zoom back	F3
Reset Zoom	F4
Insert indicator	Ctrl + I
Insert Strategy	Ctrl + G
Insert Trends	Ctrl + T
Insert Pivots	Ctrl + P
Insert single bar patterns	Ctrl + B
Insert Elliott Waves	Ctrl + E
Insert Reversal Patterns	Ctrl + R
Insert Fibonacci Clusters	Ctrl + F
Insert Custom Study	Ctrl + H
Insert Ingenious MA	Ctrl + J
Noise Removal	Ctrl + M
Revert noise removal	Ctrl + Shift + M
Model Builder	F5
Strategy Builder	F6
Indicator Builder	F7
Function Builder	F8
Simulations	F9
Study Builder	F10
Alert Builder	F11
Custom time series	F12

New model	Ctrl + F5
New strategy	Ctrl + F6
Technique dependencies	Ctrl + F9
Alert History	Ctrl + F10
Custom bars	Ctrl + F11
Trace watcher	Ctrl + F12
Data Manager	Alt+ Ctrl + D
NeatScan	Alt+ Ctrl + N
Streaming mode	Alt + Ctrl + S

Model Builder

New Model	F2
Edit the Model	F3
Copy the Model	F4
Delete the Model	Del
Train the Model	F5
Analyze Training Range	F6
Analyze Test Range	F7
Insert Training Range	F8
Insert Test Range	F9
Insert Forecasted Price	F10
Create Neuro Strategy	F11
Save Model Output as CSV	Ctrl + S
Trace watcher	Ctrl + F12
Import	Ctrl + I
Export	Ctrl + E
Help	F1

Strategy Builder

New Strategy	F2
New Neuro Strategy	Ctrl + F2
Edit the Strategy	F3
Copy the Strategy	F4
Delete the Strategy	Del
Apply to current chart	F5
Simulations	F8
Optimize	F9
Trace watcher	Ctrl + F12
Import	Ctrl + I
Export	Ctrl + E
Help	F1

Simulations

New Simulation	F2
Info…	F3
Run the Simulation	F4
Delete the Simulation	Del
Insert signals	F5
Apply strategy to current char	F6
Save	Ctrl + S
Trace watcher	Ctrl + F12
Help	F1

Indicator Builder

New	F2
Edit	F3
Edit Expression	Ctrl + F3
Copy	F4
Delete	Del
Insert into chart	F5
Trace watcher	Ctrl + F12
Import	Ctrl + I
Export	Ctrl + E
Help	F1

Study Builder

New	F2
Edit	F3
Copy	F4
Delete	Del
Insert into chart	F5
Trace watcher	Ctrl + F12
Import	Ctrl + I
Export	Ctrl + E
Help	F1

Function Builder

New	F2
Edit	F3
Copy	F4
Delete	Del
Insert into chart	F5
Trace watcher	Ctrl + F12
Import	Ctrl + I
Export	Ctrl + E
Help	F1

Alert Builder

New	F2
Copy	F4
Delete	Del
Help	F1
Import	Ctrl + I
Export	Ctrl + E

Custom Time Series

New	F2
Edit	F3
Delete	Del
Reload All	Ctrl + R
Help	F1

Custom Bars

Insert	Ins
Append	Ctrl + Ins
Remove	Del
Move Bar Up	Ctrl + Up Arrow
Move Bar Down	Ctrl + Down Arrow
Increase Bar Height	Shift + Ctrl + Up Arrow
Decrease Bar Height	Shift + Ctrl + Down Arrow
Invert Bar	Ctrl + I
Select All	Ctrl + A
Clear all	Ctrl + Shift + C

DLL Manager

Add	F2
Edit	F3
Remove	Del
Test	F5

Trace Watcher

Save	Ctrl + S
Clear	Ctrl + Alt + C

Data Manager

Update the symbol	F5
Batch update	Ctrl + F5
Import from MetaStock	Ctrl + M
Import from Text files	Ctrl + T
Export symbol data	Ctrl + S
Global Datasource change	Shift + Ctrl + D
Abridge Symbols	Shift + Ctrl + A
Add new symbol	Ctrl + N
Add from Ticker List	Shift + Ctrl + N
Start Streaming	F11
End Streaming	F12
Edit Properties	F3
Edit Price Data	F4
Clear Price Data	F8
Holidays…	Ctrl + H
Exchanges	Ctrl + E
Futures Database	Ctrl + U
Help	F1

NeatScan

New	F2
Edit	F3
Copy	F4
Delete	Del
Run	F5
New Group	Ctrl + F2
Rename Group	Ctrl + F3
Delete Group	Ctrl + Del
Import	Ctrl + I
Export	Ctrl + E
Help	F1
Open chart	Ctrl + O
Open all charts	Ctrl + Shift + O
Select columns to display	F12
Export results	F11

Progress dialogs

Stop	Alt + S
Pause	Alt + P

Improvian Editor

Check	F5
Copy	Ctrl + C, Ctrl + Ins
Paste	Ctrl + V, Shift + Ins
Cut	Ctrl + X, Shift + Del
Undo	Ctrl + Z
Redo	Shift + Ctrl + Z
Clear	Ctrl + Del
Auto Complete	Ctrl + Space
Select All	Ctrl + A
Show messages	Ctrl + M
Show dictionary	Ctrl + T

Print	Ctrl + P
Options -> Editor	Ctrl + F10
Options -> Improvian	Ctrl + F11
Options -> Code templates	Ctrl + F12
Search for function	Ctrl + F
Insert function to the code	Ctrl + I
Details on selected function	Ctrl + D
Save and exit	Ctrl + S

Disclaimer

LEGAL NOTICE:

Tradecision generates hypothetical or simulated performance results. Hypothetical or simulated performance results have certain inherent limitations. Unlike an actual performance record, simulated results do not represent actual trading. Also, since the trades have not actually been executed, the results may have under- or over-compensated for the impact, if any, of certain market factors, such as lack of liquidity. Simulated trading programs in general are also subject to the fact that they are designed with the benefit of hindsight. No representation is being made that any account will or is likely to achieve profits or losses similar to those shown.

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Support

The Tradecision Support Team is dedicated to helping you succeed with Tradecision. That is why our support it is easily accessible, thorough, flexible and free.

Feel free to contact us via:

E-mail
support@tradecision.com

Internet
http://www.tradecision.com/support/support.htm

or

Live Support (online chat)

Phone:
(347) 416 6083 (7am - 3pm Eastern Time)
(888) 862 2759, ext. 3 (9am - 5pm Pacific Time)
+44 (0) 845 310 4169 (9am - 5pm UK Time)

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(510) 279 5649

Mail
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Please include the following information with your technical support questions:

Clear, detailed description of the problem or the question.
Is the problem reproducible? If so, how? If a dialog box with an error message was displayed, please include the full text of the dialog box, including the title on the title bar.

Which version of Windows are you using?
For example, Windows XP, Service Pack 2.

Which version of Tradecision are you using?
On the Tradecision menu, click Help and then click About. Please include the entire "version" line in your problem report.

Thank you for using Tradecision!

We wish you the best of luck in your trading!

Should you have any questions, feel free to contact
The Tradecision Technical Support Team at
support@tradecision.com

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